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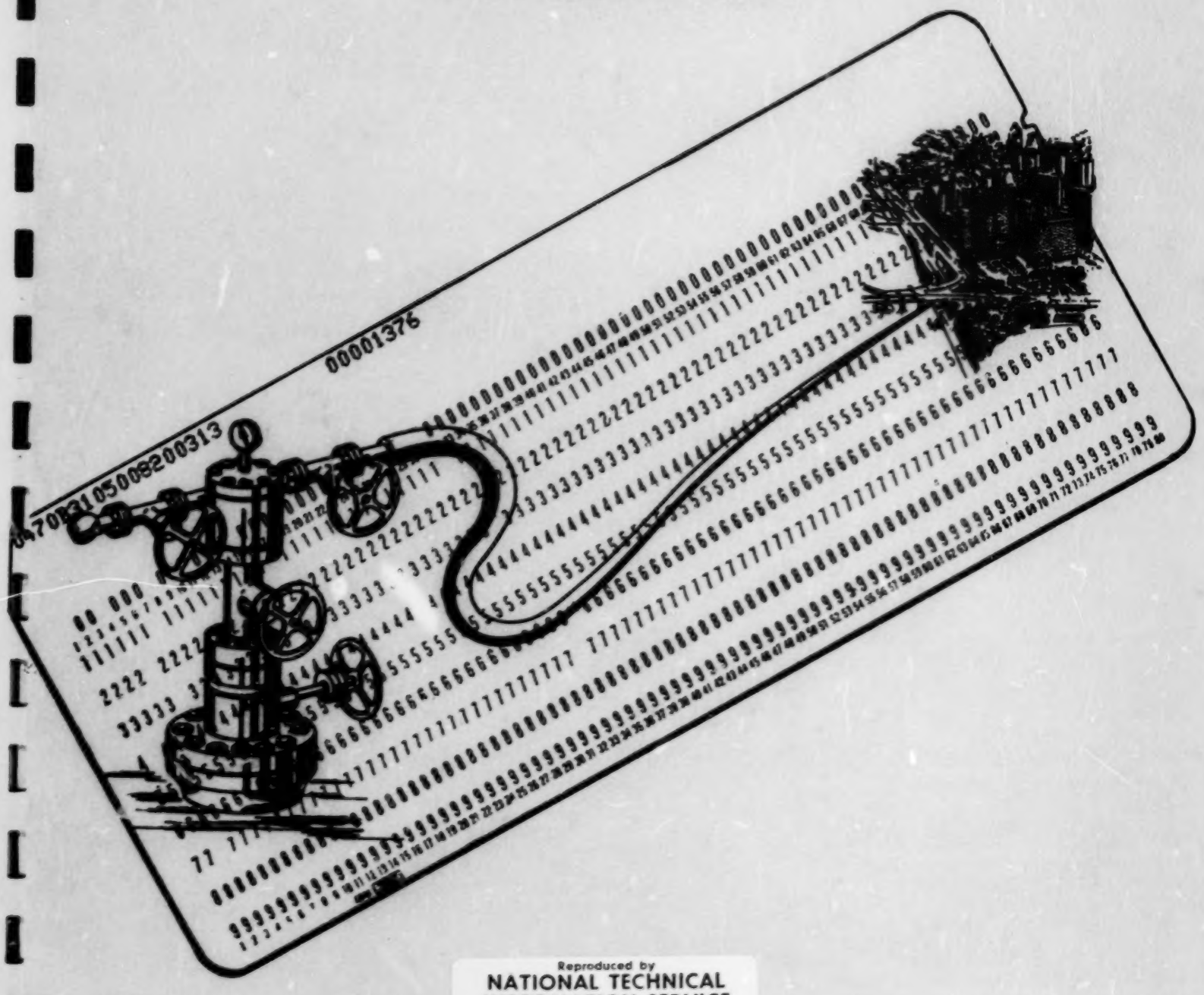
SYSTEMS STUDY OF DATA AVAILABILITY ON NATURAL GAS



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UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

June 1971

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A report is presented, which discusses the availability of natural gas data, the sources of data, the data deficiencies, and the cost of instituting a data bank. It has been proposed that a natural gas data bank be established and instituted by using data sources which are credible, ongoing, provide a continuous data series, yield specialized information and are sufficiently uniform for programming. The core of the information will be furnished by the Bureau of Mines, the Federal Power Commission, and the American Gas Association. The data bank will show the dynamic phases of natural gas supplies from potential resources to proved reserves and annual production. The computerized data will indicate the manner in which domestic and foreign supplies are linked to the U.S. markets and utilized by residential, commercial, electric utilities, industrial, and other consumer sectors within specific areas. Information pertinent to natural gas supply development rates, natural gas prices, current and future consumer demands, and sulfur quality evaluations will be entered in the data bank. The cost of instituting the data bank will be approximately $250,000.

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ABSTRACT

This report discusses the availability of natural gas data, the sources of data, the data deficiencies, and the cost of instituting a data bank.

Natural gas, the largest source of low sulfur fuels, satisfies one-third of the Nation's energy demand. The clean burning quality of natural gas, coupled with the need for improving air quality standards, necessitates greater knowledge as to the availability of natural gas supply, the capability of transportation systems to market natural gas, and the dependence and manner that the various consumer sectors utilize natural gas.

The Bureau of Mines, with financial support from the Air Pollution Control Office of the Environmental Protection Agency, could establish and proposes to institute a natural gas data bank which will provide such knowledge.

A complete and efficient data bank program will be accomplished by using data sources which are credible, ongoing, provide a continuous data series, yield specialized information, and are sufficiently uniform for programing. Initially, data will be available from some 13 sources. The core of the information will be furnished by the Bureau of Mines, the Federal Power Commission, and the American Gas Association.

The data bank will show the dynamic phases of natural gas supplies from potential resources to proved reserves and annual production. The computerized data will indicate the manner that the

domestic and foreign supplies, located in the various parts of the United States and the world, are linked to United States markets and utilized by residential, commercial, electric utilities, industrial, and other consumer sectors within specific geographical areas such as Air Quality Control Regions. Information pertinent to natural gas supply development rates, natural gas prices, current and future consumer demands, and sulfur quality evaluations will become part of the data storage bank.

There are apparent data deficiencies within existing data collection programs, but for the most part such data gaps may be reduced by modifying Bureau and other agency collection procedures. It is likely that in the future other data sources, not selected at this time, will contribute to the data bank as their collection procedures improve.

The cost of instituting the data bank will be approximately $250,000, thereafter. Approximately $80,000 annually will be required to maintain the system.

ACKNOWLEDGMENTS

The Natural Gas Branch of the Division of Fossil Fuels, U.S. Bureau of Mines, prepared this report with the encouragement of the Air Pollution Control Office of the Environmental Protection Agency. The sources of data cited herein were helpful in both providing information and ideas for using their data.

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DEFINITION OF TERMS

Associated-dissolved gas--The combined volume of natural gas which occurs in crude oil reservoirs either as free gas (associated) or as gas in solution with crude oil (dissolved).

Btu (British Thermal Unit)--The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit at atmospheric pressure.

City gate--A contractual location at which ownership of gas is transferred from the transmission company to the utility distributor.

Commercial service--Service to customers primarily engaged in wholesale or retail trade, agriculture, forestry, fisheries, transportation, communications, sanitary services, finance, insurance, real estate, hotels, rooming houses, government.

Direct sale--A sale made by a transmission company to industrial users and electric utility companies for power generation. Such sales are made both on an interruptible and firm delivery basis. See Main Line sales.

Dissolved natural gas--Natural gas in solution with crude oil in the reservoir at original reservoir conditions.

Distribution system--Utility storage facilities, mains, service lines, and metering equipment which supply and measure gas delivered to the ultimate consumer.

Field sales--Natural gas sales made from wells or from points along gathering and transmission lines within fields or production areas.

Firm sales--Firm gas sales to industrial and other customers are those made under schedules or contracts which anticipate no interruption of gas service.

Industrial service--Service to customers engaged primarily in a process which creates or changes raw or unfinished materials into another form or product. Includes mining and manufacturing.

Interruptible sales--Low priority service offered to customers under schedules or contracts which anticipate and permit interruption on short notice, generally in peak load seasons. Gas is available on an interruptible basis only after firm sale requirements have been met.

Interstate gas--Gas transported across State lines or gas carried in pipelines subject to Federal Power Commission jurisdiction.

Intrastate gas--Gas which is produced, processed, transported, and contracted for, all within the borders of one State. Such gas is not subject to Federal Power Commission jurisdiction.

Liquefied natural gas (LNG)--A clear flammable liquid, almost pure methane, attained by reducing the temperature to -259° F. at atmospheric pressure.

Liquefied petroleum gas (LPG)--A gas containing certain specific hydrocarbons which are gaseous under normal atmospheric conditions, but can be liquefied under moderate pressure at normal temperatures.

Main Line Sales--Sales of natural gas to industrial customers and electric power generating companies served other than from local distribution systems operated either directly by the pipeline transmission company or as a subsidiary of the transmission company. Included

in this category are: firm, off peak, interruptible, and other. In the "other" category would be sales to public authorities. See Direct sales.

Manufactured gas or coal gas (coke oven gas)--A gas obtained by destructive distillation of coal, or by thermal decomposition of oil, or by the reaction of steam passing through a bed of heated coal or coke.

Mixed gas--A gas produced by mixing manufactured gas with natural or liquefied petroleum gas, resulting in a product which has a Btu value exceeding the manufactured gas.

Natural gas--Any gas of natural original that is composed primarily of hydrocarbon molecules and small quantities of various non-hydrocarbons existing in the gaseous phase.

Non-associated gas--Free natural gas not in contact with crude oil in the reservoir.

Off peak gas--Gas supplied during period of relatively low system demands as specified by the seller.

Potential supplies--Estimated supplies to be found by wells which can be expected to be drilled in the future under assumed conditions. Such estimates are classified in 3 categories:

a. Probable--The prospective quantity of gas yet to be found, exclusive of proved reserves, by the growth of existing fields. (PGC)

b. Possible--The prospective quantity of gas yet to be found, exclusive of proved reserves, by new field discoveries in areas of established production.

c. Speculative--The prospective quantity of gas yet to be found, exclusive of proved reserves, attributable to new field discoveries in areas where sediments are present but have no prior production history.

Proved reserves--The current estimated quantity of natural gas which analysis of geologic and engineering data demonstrate with reasonable certainty to be recoverable in the future from known oil and gas reservoirs under existing economic and operating conditions.

Residential sale--Service to customers for residential purposes by individual meter in a single family dwelling or building, or in an individual flat or apartment, or to not over four households served by single meter in a multiple family dwelling.

Sales for resale--Service to other utility companies, governmental agencies (municipal, county, State, federal) for distribution and resale to ultimate customers.

Sales to public authorities--Sales to governmental agencies (municipal, county, State, federal) for lighting streets, highways, parkways, or other public places.

Space heating--Service to customers using gas to supply the principal space heating requirements of a dwelling; other residential uses are included herein if supplied under the same rate classification.

Sour gas--Natural gas containing such amounts of compounds of sulfur as to make it impractical to use without purifying, because of its corrosive effect on pipeline, metering facilities, and appliances. Gas with hydrogen sulfide content above 1.5 grains per 100 cubic feet,

or total sulfur content above 30 grains per 100 cubic feet (7,000 grains = 1 pound) 635 grains per 100 cubic feet = 1 percent by volume).

Sweet gas--Gas found in its natural state containing such small amounts of compounds of sulfur that it can be used without purifying with no deleterious effect.

Transmission mains (pipelines)--Pipelines installed for the purpose of transmitting gas from a source of supply to one or more distribution centers, or one or more large volume customers, or a pipeline installed to interconnect sources of supply.

Transmission sales--Sales made from points along transmission lines not within gas fields or production areas.

INTRODUCTION

Natural gas satisfies one-third of the Nation's need for energy and it is the largest usable source of low sulfur fuel. Over the last quarter century, the demand for natural gas has increased at a rate greater than for any other direct energy fuel. The historic market growth, coupled with emerging national environmental quality objectives, has brought about needs for new and more detailed information concerning natural gas supply development, transmission, and utilization. The Bureau of Mines, with financial support from the Environmental Protection Agency, proposes to establish a comprehensive natural gas data bank. The data bank will provide a centralized source of information regarding the availability of natural gas and other gaseous fuel supplies, the capability of transmission systems to deliver such supplies to specific markets, and the detailed current and future gaseous fuel consumption patterns.

This survey, funded in part by the Air Pollution Control Office of the Environmental Protection Agency, examines the sources and availability of natural gas data and identifies the data essential for initiating a data bank.

The immediate need for intelligence on so vital a fuel necessitates the utilization of existing data collection systems. The integration of the several ongoing data collection systems will provide an effective core of specialized and detailed data suitable for a data bank.

The collection of natural gas data has been a fundamental task of the Bureau of Mines since its inception. The detail and quality of information collected has altered over the years reflecting new data requirements by the government, private institutions, and industry. The Bureau's data sources are some 2,600 respondents consisting of natural gas producers, processors, transporters, distributors, and governmental agencies. The information is supplied voluntarily, in recognition of the value of supporting a single repository of natural gas data which can sustain an ongoing statistical program, publish, and distribute information to the interested public.

The Bureau data, supplemented with the information collected by the American Gas Association, who serve the needs of the natural gas distribution and pipeline industry, and the Federal Power Commission, which collects information in conjunction with the regulation of natural gas sales in interstate commerce, will comprise the core of the data bank. Additional data sources will implement the development of information regarding natural gas supply, transmission, and utilization.

The data bank will use data from sources which meet the following criteria: (1) The data source is generally recognized as a credible repository of statistical data; (2) the data are available as a continuous series; (3) the data program is likely to be sustained; (4) the data source provides specialized information; and (5) the data are sufficiently uniform for computer programing.

All known data sources were evaluated, and based on the criteria discussed above, certain sources were rejected at this time for data programing. For example, the data published by the financial services, such as Moody's manuals, Standard and Poors, "Standard Corporation Records," and Arnold Bernhard & Co.'s, "Value Line Surveys," derived from individual corporation reports and releases such as annual reports, proxy statements, prospectuses, and from "Form 10 K" Statements, filed by corporations with the Securities and Exchange Commission, will not be used for data bank programing. While there is no question that such financial advisory services provide a valuable service to their subscribers, the information published relates primarily to individual companies. Unfortunately the data reported for each company lacks sufficient detail and the coverage of pertinent information is not uniformly reported for each company.

Data screening will result in efficient data programing at minimal costs without loss of data quality. Programing a data bank with the information selected herein is preferable to burdening a data bank with data from sources which merely provide redundant, irrelevant, and discontinuous information.

The sum total of data that will be programed reveals apparent data deficiencies, which for the most part can be overcome by the modification of Bureau data collection procedures. In other instances, analysis of appropriate data will provide information not available directly.

The report discusses the availability and sources of data selected for programing, identifies data deficiencies inherent in current data collection programs, provides recommendations to overcome data gaps, and indicates the initial cost of establishing the data bank.

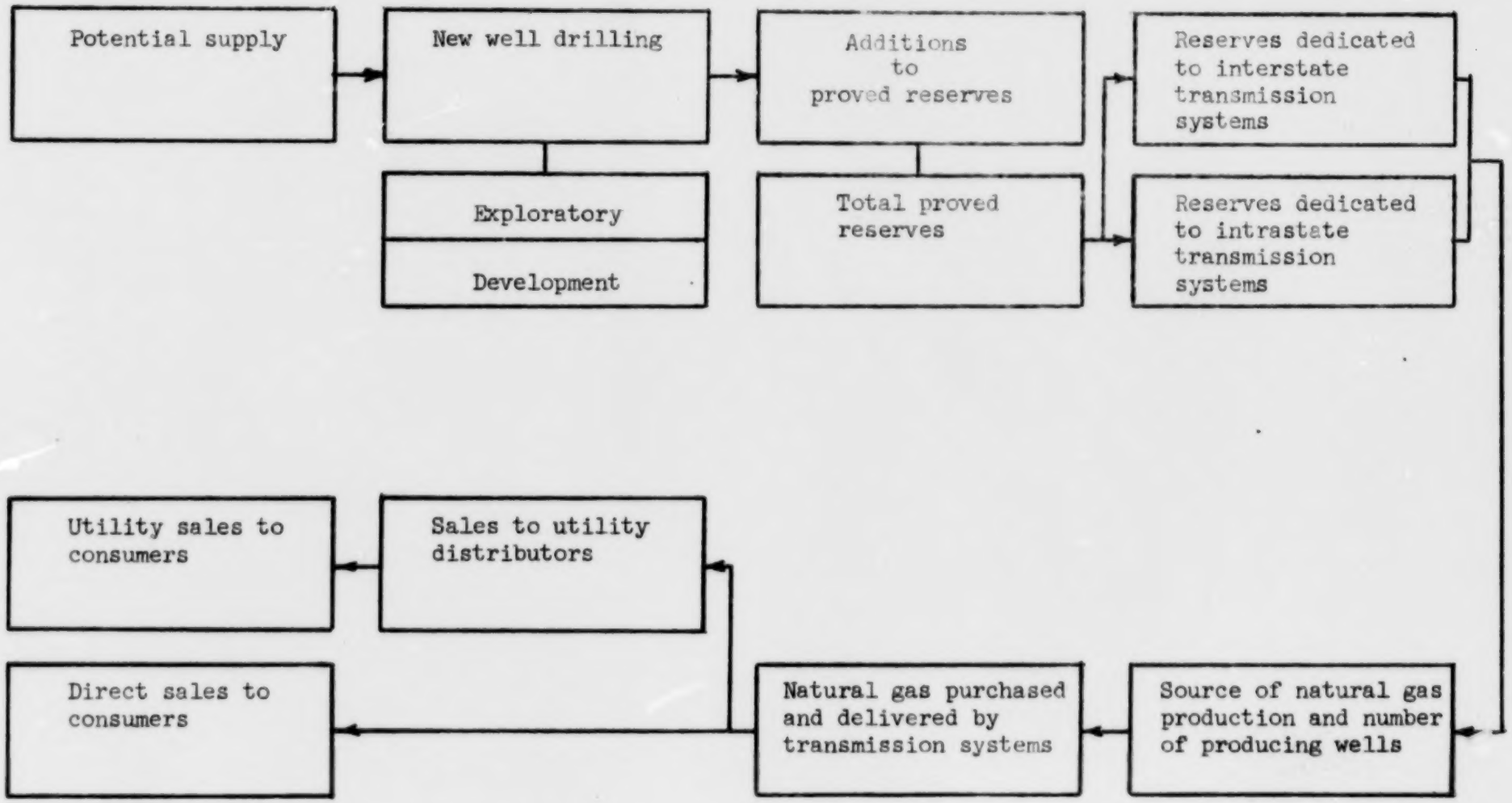
Appendix "A" discusses the major categories of information available from the various sources selected for data processing and the form in which such data is available.

Appendix "B" illustrates in tabular form the specific data which will be included in the data bank along with its source and geographic coverage.

Upon completion, the Bureau's natural gas data bank will be the most complete automated data retrieval system regarding natural gas supply, transmission, and utilization. Schematic 1, "Natural Gas Data Components: Supply, Transmission, and Utilization," is a synopsis of the natural gas data bank.

The data bank program will continually strive to seek new pertinent data through improved collection procedures.

SCHEMATIC 1: NATURAL GAS DATA COMPONENTS: SUPPLY, TRANSMISSION, AND SALES AND UTILIZATION


Potential supply
New well drilling
Exploratory
Development
Additions to proved reserves
Total proved reserves
Reserves dedicated to interstate transmission systems
Reserves dedicated to intrastate transmission systems
Utility sales to consumers
Sales to utility distributors
Direct sales to consumers
Natural gas purchased and delivered by transmission systems
Source of natural gas production and number of producing wells

SELECTED NATURAL GAS DATA SOURCES

The three main sources of natural gas data are the American Gas Association (AGA), the Federal Power Commission (FPC), and the Bureau of Mines (Bureau). Individually, these sources do not provide comprehensive natural gas statistical information. However, collectively these sources, along with specialized information published by the National Coal Association (NCA), the American Association of Petroleum Geologists (AAPG), the Bureau of the Census (Census), the U.S. Geological Survey (USGS), the Bureau of Labor Statistics (BLS), the Potential Gas Committee (PGC), the Future Gas Requirements Committee (FGR), the Canadian Petroleum Association (CPA), and the Oil and Gas Journal (OGJ) provide an acceptable data universe for establishing a data bank. Most of the above sources provide data on an annual and to a lesser extent on a monthly basis. However, the data developed biennially by the PGC and FGR, and the Census data available every fifth year, are also helpful for making natural gas supply and demand analysis. In addition, although Brown's Directory of North American Gas Companies provides only limited end use data, it is a useful source for specialized consumer cost information.

The geographic coverage of the information available from the above sources includes municipalities, counties, States, regional, and national data.

NATURAL GAS DATA AVAILABLE FOR A DATA BANK

Natural gas data generally may be classified into three broad categories: supply, transmission, and utilization. However, the data bank will not be structured principally to yield information in three categories, but will be oriented to market supply-demand relationships.

Natural Gas Supply Data

Natural gas supply data represents three stages of supply status: (1) potential supply or resources, (2) proved reserves, and (3) production.

The potential or anticipated quantities of natural gas awaiting additional development or discovery have been estimated by many. The two most prominent sources for such information include the industry supported PGC and the USGS. Although each employ different criteria for determining future supply prospects, portions of their estimates correspond. The USGS concept of potential natural gas resources is more extensive; the potential resources estimate is approximately seven times greater than proved reserves, and is defined as "indicated reserves and undiscovered recoverable resources." The PGC estimate of potential supplies is defined as probable, possible, and speculative. The three category classification of unproven reserves provides a more conservative estimate of potential supplies which is four times greater than proved reserves.

Exploration and development efforts continually strive to convert potential supplies into proved reserves. The rate at which

proved reserves are discovered and developed depends on technology, demand, and economics. Proved reserves may be regarded as the current inventory of supply, inasmuch as the location and ability to produce such reserves has been established.

Data are available which show the quantities of proved reserves within each State, the amount of proved reserves associated and not (non-) associated with crude oil, the proved reserves in underground storage, and the proved reserves dedicated for sales to specific interstate transmission companies. Such information provides a current view of the mid-term availability of known natural gas supplies to markets. At present, the quantities of United States proved reserves are approximately 14 times greater than production.

In contrast with proved reserve and potential supplies the natural gas supply immediately responsive to demand is production. Annual production of natural gas by geographic areas reports the amount of natural gas being supplied to markets. Less than 4 percent of the domestic market demand is met by foreign natural gas production. The importation of natural gas via pipeline and in the form of liquefied natural gas (LNG), and the manner that such supplies are integrated into the domestic market is available from several sources.

Data related to supply includes information on the annual completion of natural gas discovery and development wells, the total number of gas producing wells, and the annual number of abandonments. Such data reflects the trends of regional supply development and the producing capacities. In addition, the economic factor of natural gas

wellhead prices and the comparable prices of other gaseous fuels at the source of supply is considered in the data bank in view of its influence on supply development.

The "gaseous" fuel supply information will include data which show the amount of manufactured gas and liquefied petroleum gas distributed in the market. Such supplies currently satisfy less than 2 percent of gas fuel customers and less than 1 percent of thermal energy delivered by utility distributors.

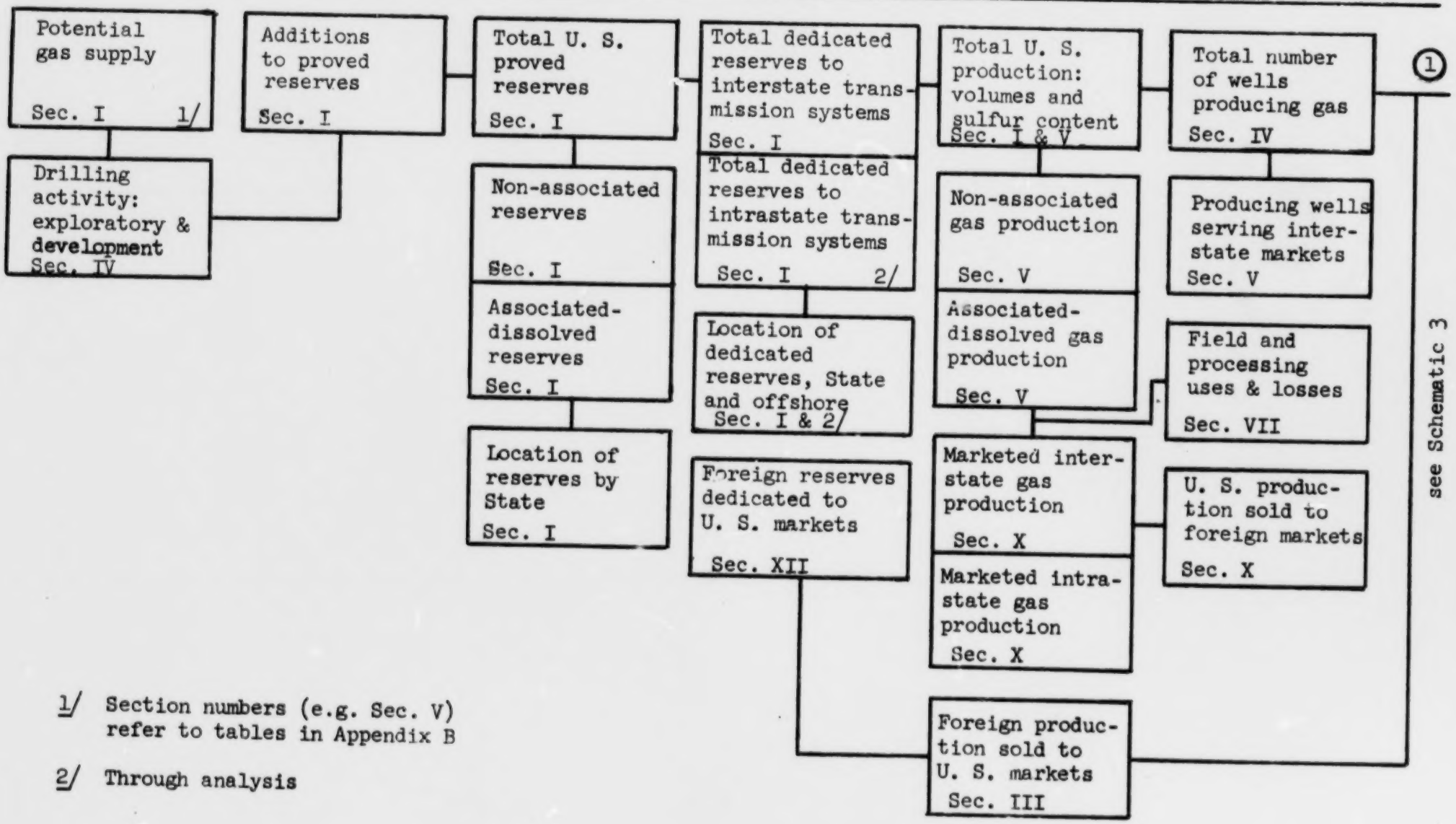
At such time as synthetic gas is produced for commercial purposes, appropriate assessment of supply and annual production rates will become part of the data bank.

Schematic 2, Natural Gas Supply, illustrates the sequential data pattern.

Natural Gas Transmission Data

Pipelines or transmission systems generally are classified either as intrastate or interstate systems. Pipelines deliver natural gas from the sources of supply directly to markets or to distributors or utility companies which subsequently resell gas to the ultimate consumer. Generally each natural gas transmission or pipeline system has principal sources of supply and market terminals. Data are available which show the significant sources of natural gas supply available to each transmission system, the amount of natural gas supplies dedicated to markets, the annual natural gas throughput, and the market terminal for each transmission system. In addition, information regarding the location of each pipeline company's storage

SCHEMATIC 2: NATURAL GAS SUPPLY



1/ Section numbers (e.g. Sec. V) refer to tables in Appendix B

2/ Through analysis

facilities and capacities and sales to and receipts of gas supplies from other pipelines is available.

The amount of transmission of natural gas across national boundaries and the importation of liquefied natural gas by tankers, as well as the price paid for natural gas at the source (the wellhead price discussed previously) and the terminal (or wholesale) price, paid by the utility distributor will be included in the data bank.

Schematic 3, Natural Gas Transmission, illustrates the data components.

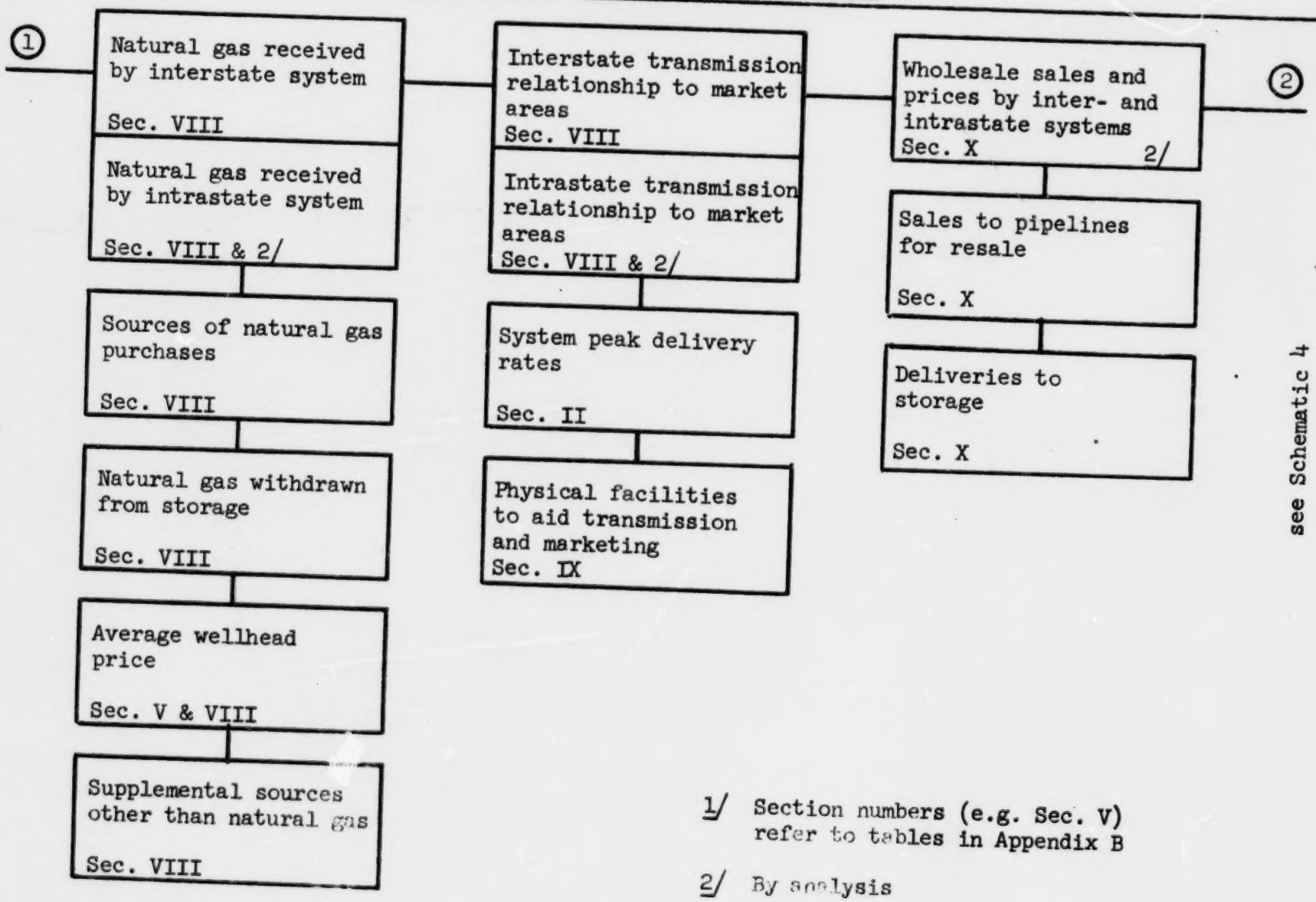
Natural Gas Utilization Data

The data bank will include such information as natural gas sales to utility distributors and subsequent sales to ultimate consumers and the direct sales to the consumer sectors by non-utility distributors. The utilization data may be classified under five categories: residential, commercial, industrial, electric utilities, and others. The wholesale and retail prices of natural gas to distributors and ultimate consumers, respectively, will be included in the data bank. Forecasts of short and long term demands for natural gas demand by the major consumer sectors prepared by FRC and the utility industry projections provided annually by the AGA will also be included in the data bank.

Schematic 4, Natural Gas Utilization, shows the general data components of natural gas usage.

SCHEMATIC 3: NATURAL GAS TRANSMISSION

continued from Schematic 2



see Schematic 4

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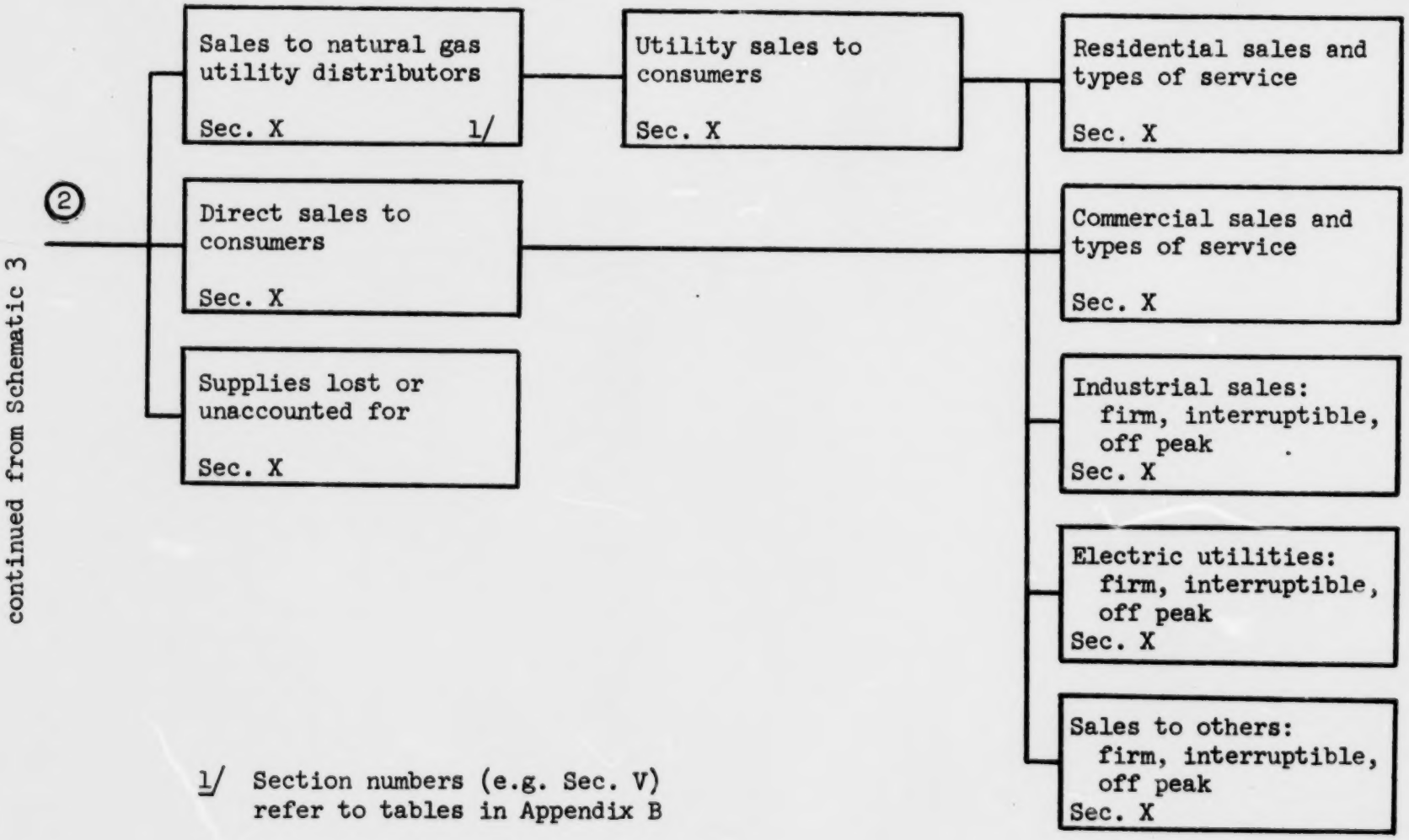
SCHEMATIC 4: NATURAL GAS SALES AND UTILIZATION



1/ Section numbers (e.g. Sec. V) refer to tables in Appendix B

Residential Consumers:

The residential market consists of over 38 million customers. Natural gas is used for space heating, cooking, waterheating, air conditioning, for operating clothes dryers, ornamental lighting, and a variety of lesser services. The residential market consumes about one-fourth of the natural gas delivered to customers. In addition to natural gas users, there are approximately 8,000 customers using manufactured and LPG and 2,000 customers using a mixture of natural and manufactured gas delivered through utility mains.

The data bank will include such information as the number of residential customers, sales volumes, and the cost of service. The residential customers costs will be identified on the basis of service provided and the amount of utility and non-utility service will be quantified.

Commercial Consumers:

Commercial consumers consist primarily of businesses and commercial dwellings such as apartments and hotels. The uses of natural gas in this market are similar to the residential market. Less than one-tenth of the natural gas demand meets the needs of the commercial market. There are over 3 million commercial customers served by natural gas and over 600,000 commercial customers using manufactured and mixed gas and LPG. Over one-half of the primary energy needs of the household and commercial market combined is supplied by natural gas.

The data bank will include information for the commercial market similar to that available for the residential market.

Industrial Consumers:

The industrial market, excluding electric power generation, involves over 200,000 customers who consume over two-fifths of the natural gas delivered to markets. One-half of the primary energy needs of industry is provided by natural gas. It is estimated that another 2,000 industrial consumers use mixed and manufactured gas and LPG. The industrial market is the most complex utilization sector in that gas fuels are used in various industrial processes as well as in providing the conventional heat-power-cool service.

The natural gas data bank will include natural gas sales to industrial consumers by Standard Industrial Classification (SIC), and industrial sales will be classified as interruptible or firm. In addition, the data bank will include the cost of service to this market and the amount of service supplied by utilities and non-utility companies.

Electric Power Utilities Consumers:

The electric power utilities represent nearly one-fifth of the market demand for natural gas. Approximately 13 percent of the energy required by electric powerplants is provided by natural gas. There are approximately 1,000 steam-electric plants in the United States, most of which are capable of using natural gas. Purchased electricity or secondary energy is supplied primarily to the household, commercial, and industrial sector. The household and commercial sector purchased approximately 55 percent of utility generated electricity, and electricity accounted for 17 percent of the energy inputs of this sector.

The electricity purchased by the industrial sector amounted to 45 percent of electric utility sales, and purchased electric power accounted for nearly 10 percent of energy inputs in this sector.

The data bank will provide information indicating the volumes of sales of natural gas to electric powerplants under firm and interruptible contracts, the seasonal sales trends, and the cost of supplies.

Other Consumers:

This sector includes consumption data for a variety of consumer groups not classified among the four major consumer sectors discussed above, and gas used and wasted in the extraction and transmission of natural gas to markets.

The deliveries of natural gas to municipalities and public authorities for institutional heating, street lighting, etc., is included within this category. Such deliveries account for less than 2 percent of the natural gas delivered to consumers.

The amount of domestic natural gas that does not reach domestic markets because of transmission losses, changes in underground storage, field use, flaring, repressuring, and exports constitute about one-fifth of gross withdrawals of natural gas from reservoirs. Nearly a third of gross withdrawals is reinjected into reservoirs for repressuring. The data bank will provide information that will show the pertinent geographic location and volumes of natural gas withdrawn from reservoirs.

SULFUR CONTENT DATA

Gas from many natural gas fields contains no sulfur compounds (sweet gas) and therefore presents no purification problems. However, there are fields in the U.S. which produce sour gas containing a trace to a significant percentage by volume of sulfur compounds. In view of the highly corrosive characteristics of sour gas, few markets are capable of using such gas which has not had the sulfur removed, and good pipeline distribution practice calls for a total sulfur content below 1 grain per hundred cubic feet.

The Bureau collects natural gas samples from gas and oil wells and pipelines as part of a continuous survey of occurrences of helium in natural gas. These samples are analysed by mass spectrometer and all analyses include information on hydrogen sulfide content. Samples are identified by State, county, field, well name, location, and owner. Approximately 9,000 natural gas samples have been analysed as a part of this program.

MAJOR DATA GAPS

Although it is difficult, at this stage, to anticipate all data requirements and therefore to determine all deficiencies in information, it is possible to identify the apparent major areas of data deficiencies which are as follows:

1. Dedicated intrastate reserves--Data are available on total proved reserves and interstate reserves dedicated to markets, but the total of uncommitted or undedicated proved reserves cannot be derived from these figures due to the lack of information on the committment reserves for intrastate sales contracts.

2. Interstate transmission systems capacities--Although data are collected on length, nominal diameter, and the number and horsepower of compression stations with respect to principal interstate pipelines, several categories of information vital to the calculation of systems capacities are lacking. These deficiencies in data include inside pipe diameter, operating pressure, line gradient, and a consistent definition of what constitutes a major line (some loop lines omitted from reports of respondents).

3. Length, capacity, ownership, location, and movements through intrastate pipelines (other than utility gas mains)--Except in isolated cases, none of the above items of information are reported.

4. Distinction between firm and interruptible sales in the intrastate market--This type of information is collected on a regular basis for interstate sales only.

5. Consumption data for major county and/or Air Quality Control Regions (AQCR)--Detailed consumption information is available for many individual communities served by municipal utilities or transmission companies, but data are often combined for cities and towns served by the same gas utility companies. As a result, consumption information for a number of large cities is grouped with that of other municipalities of various sizes located both within and outside of the same county or AQCR, and in some cases, data for major industrial centers located in different counties and/or AQCR's have been combined. As a result a serious gap exists with respect to information on gas requirements within some of the country's principal industrial counties and/or AQCR units.

RECOMMENDATIONS FOR REDUCING MAJOR DATA DEFICIENCIES

It is feasible, with the approval of the Office of Management and Budget, where required, for the Bureau to alter its collection procedures in order to fill some of the data gaps discussed above. However, recognizing that data is voluntarily submitted to the Bureau and the reluctance of the gas industry to undertake additional or new reporting requirements which may require a sizeable increase in reporting workload, it is considered desirable to balance the degree of need for each item with the difficulties involved in its collection. However, should a clear need for data be demonstrated, the industry could be persuaded to supply the pertinent data. The collection of new data may be successfully accomplished under the voluntary program. Any judgement as to the need for a compulsory data collection program is premature. At such time as a data bank is established and analysis of data indicates an absolute need for information which proves impossible to obtain within the existing system, appropriate changes can be made to collect pertinent data.

Recommendations concerning procedures to reduce the major data deficiencies outlined previously follow:

1. Dedicated intrastate reserves--Gas industry firms have in the past indicated a considerable reluctance to provide this information and it would appear unlikely that a meaningful response to this question could be obtained on a voluntary basis. However, in view of the limited number of States with significant gas reserves,

it may be possible in time to overcome this data gap to a considerable extent by further contact with key State agencies.

2. Interstate transmission systems capacities--The determination of a pipeline system's capacity to transport natural gas to specific delivery points is an extremely complex exercise due to the large number of variables involved and few, if any, transmission companies would be in a position to provide such data without the expenditure of considerable effort. Consequently, very little voluntary response to inquiries for this information could be expected. Even in the event that the companies could be persuaded to at least provide the data on the missing variables referred to under major data gaps, the manhour expenditure required for the Bureau to calculate capacities would probably be prohibitive. However, an analysis of FPC data on peak day delivery from transmission companies to individual utility companies probably would provide a basis for arriving at reasonable approximations of pipeline capacities at less cost.

3. Length, capacity, ownership, location, and movements through intrastate pipelines (other than utility gas mains)--Due to the considerably increased reporting effort required of respondents and their reluctance to provide data on an intrastate basis, this information probably

could not be obtained on a voluntary reporting basis. Nevertheless, the final statement under Item 1 above is also applicable to this problem.

4. Distinction between firm and interruptible sales in the intrastate market--This data could possibly be collected by means of minor additions to Bureau reporting forms 1340-A and 1341-A. These changes would require approval of the Office of Budget and Management.

5. Consumption data for major county and/or AQCR units--Although considerable effort will be required, the degree of need is considered to be such that an attempt should be made to fill this gap. A large part of the missing data may be obtained by means of minor additions to Bureau reporting form 1340-A. This procedure does not require outside approval, but it will be necessary to apprise gas industry firms of the vital importance of the additional data in order to secure the maximum possible cooperation. Even if this is done, some respondents will undoubtedly elect not to report on the additional items or will, because of the limitation of their own information collection and/or recording procedures, provide the data in a form other than that requested, and considerable analysis and some estimation will be required on the part of the Bureau. The degree of success in obtaining consumption data for all counties is unknown at this time.

It is recommended that the missing information which cannot be requested on Bureau form 1340-A be obtained by means of major additions to Bureau reporting form 1341-A. This procedure would require approval by the Department of the Interior; the Advisory Council on Federal Reports, a group which provides liaison between industry; and the Office of Management and Budget. APCO support would be required in order to obtain the necessary clearance for this procedure. The same comments made in the previous paragraph with respect to industry cooperation in providing additional data for form 1340-A also apply to the information which would be requested on form 1341-A.

In no instance will information supplied by respondents to the Bureau be revealed in such a way as to violate the rules of confidentiality.

COST OF ESTABLISHING DATA BANK

It is estimated that the initial task of collection, analysing, and programing a natural gas data bank, limited to the sources of information indicated herein, would cost an estimated $250,000. Thirty percent of the total cost is assigned to collecting data, 30 percent for analysis, and 40 percent for programing. These costs are in addition to those currently being expended by the Bureau of Mines for collection, evaluation, and publication of natural gas data. It must be recognized that at this stage of assessing costs, the estimate is at best an approximation.

Although much of the data is available or stored on magnetic tape, the orientation of tape programing does not lend itself to direct transfer of information to the proposed natural gas data bank. In addition, computer hardware of other sources is not compatible with that of the Bureau. The Bureau Computer Center in Denver, Colorado is equipped with two 5500 Burroughs Computers.

APPENDIX "A"

Data Bank Information Sources

The principal sources of natural gas supply and demand statistical data essential to a natural gas data bank are the Bureau of Mines (Bureau), the American Gas Association (AGA), and the Federal Power Commission (FPC). The data pertinent to the needs of these sources are collected from municipal natural gas utility distributors, natural gas transmission companies, producers, and State oil and gas conservation commissions. In addition potential supply estimates are provided by the Potential Gas Committee (PGC) sponsored by the Mineral Resources Institute of the Colorado School of Mines Foundation, Inc., and the U.S. Geological Survey (USGS).

The American Association of Petroleum Geologists (AAPG) provide statistical data for North American drilling activity, which show the result of such drilling in finding new gas discoveries and new gas supplies.

Supplemental natural gas consumer demand data for a number of municipalities is available annually from the commercial publication "Brown's Directory of North American Gas Companies." Data showing electric powerplant demand for natural gas and direct sales to industrial customers by transmission companies is published by the National Coal Association in "Steam & Electric Plant Factors" and Main Line. The NCA reports are compiled from FPC data.

The industrial use of natural gas by Standard Industrial Classification (SIC) groups and Standard Metropolitan Statistical Areas (SMSA) is reported for every fifth year (1967 data is latest) by the Bureau of Census. The Bureau of Labor Statistics publishes monthly reports of wholesale and consumer prices and indexes for commodities including natural gas. The Oil and Gas Journal (OGJ) publishes natural gas processing data.

Forecasts of natural gas requirements over short and long range periods are prepared biennially by the Future Gas Requirements Committee (FGR) and annually by the AGA. Table 1 summarizes the forms and timeliness of data available from the various sources.

Major Data Elements

The data which will be programed into a computer is not limited to the information discussed herein but the following information constitutes the major data elements. The quantities of potential natural gas supplies awaiting discovery and development are estimated and published biennially by the PGC. The information is available during the last quarter of every numbered year. The PGC classification of potential supplies of probable, possible, and speculative fit within the USGS classification of "indicated reserves and undiscovered resources recoverable under current technologic and economic conditions." Neither estimate includes supplies which can be responsive to market demand until new exploratory and development drilling take place. The potential supply information provides a reference basis for assessing the prospects for natural gas for long term future markets.

TABLE 1: FORMS IN WHICH NATURAL GAS DATA ARE AVAILABLE

Source	Form number	Data available	Form in which available	When available, months after reporting period
FPC	2 & 301-B	Purchases and Sales of Natural Gas by Interstate Companies	publication & magnetic tape	12-18 12-18
		Statistics of Interstate Natural Gas Pipeline Companies	publication & magnetic tape	10-12 12-18
FPC	11	Receipts and Disposition of Gas	publication & magnetic tape	2 12-18
		Operating Revenues & Incomes by Interstate Pipeline Co.'s	publication & magnetic tape	2 12-18
FPC	15	Gas Supplies of Interstate Natural Gas Pipeline Companies	publication & magnetic tape	15 12-18
USBM	1340-A 1341-A 1343-A	Mineral Industry Survey; Natural Gas Production and Consumption	publication & magnetic tape	2 1
USBM	Information Circular	Analyses of Natural Gases	publication & magnetic tape	12 2
AGA	Gas Facts	Statistical record of gas utility industry	publication & printout	9 8
AGA	Reserves	State & U.S. natural gas reserves	publication	5
BC	MC-63(1)(-7) MC-63(1)(7.1)	Fuels consumed in manufacturing industries	publication & magnetic tape	variable
BLS	Statistical Summary	Wholesale Price & Price Index; Consumer Price Index; Retail Prices & Indexes of Fuels	3 separate publications	7 days 1 2

(Cont'd)

TABLE 1: FORMS IN WHICH NATURAL GAS DATA ARE AVAILABLE

Source	Form number	Data available	Form in which available	When available, months after reporting period
NCA		Steam-Electric Plant Factors, (data based on FPC Forms 1,1-M & 12)	publication	12
		Main Line (Pipeline company sales to industrial users, based on FPC Form 2)	publication	12
PGC		Potential Supply of Natural Gas in the United States	publication	10
FRC		Future Natural Gas Requirements of the United States	publication	9
OGJ		Survey of Gas Processing Plants during Mid-Year in Weekly Publication	publication	6

The natural gas supplies which have been discovered and developed as economically recoverable supplies are reported annually by the AGA as proved reserves. The amount of such reserves dedicated to major interstate pipeline systems is reported by the FPC. The major pipeline companies report the recoverable proved reserves by fields, the dedicated gas supplies for future markets (through 1985), and the claimed future contract additions of gas supplies. Knowledge of the pipeline systems supply disposition and market link will provide a base for determining the availability of supply to various geographic areas during the short to mid-term period. The immediate capability of supplies to meet current demand as reflected by natural gas production is reported on a State basis by the Bureau and AGA. The FPC furnishes data on the production and sales of natural gas going into interstate commerce on a field and county basis.

Information with respect to the sulfur content of natural gas is available from the Bureau's ongoing natural gas analysis program. Normally, natural gas delivered to transmission lines must meet stringent sulfur limitations so as to avoid corrosion damage to transmission and consumer equipment. However, natural gas flaring may comprise the most significant manner whereby high sulfur bearing natural gas is consumed.

The long range availability of natural gas supplies from natural gas producers and the pipeline transmission companies to State and area wholesale markets involves the contractual arrangements between the seller and the buyer. The contracts define the amount of natural

gas reserves dedicated to the specific market over a period of time, the daily maximum and minimum delivery requirements, the terms of interruptible and firm industrial sales, and the degree of regulatory control over end use, etc. In the event the above data is not adequate for determining the availability of supplies to meet the needs of an Air Quality Control Region (AQCR), new data collection procedures and authority discussed under "Recommendations for Reducing Major Data Deficiencies" would be required to obtain such information.

The pipeline systems which deliver natural gas from the source of supply to the gas utility distributor or to the ultimate consumer are classified into two broad categories, interstate and intrastate pipelines. Data regarding the volume of sales for ultimate consumption or resale, and the markets being served, is available for each interstate pipeline system from the FPC. Intrastate supply and transmission data is not as readily available. The State sources of intrastate data vary as to regularity and completeness of reporting such marketing information.

Data on underground storage is available on a State basis from the Bureau. The FPC reports on underground storage facilities for interstate gas on an individual location basis. Storage systems implement the marketing of natural gas by increasing the peak-load time of pipelines. Gas storage fill-up normally occurs during the summer months and depletion during the winter heating season.

Most natural gas consumers are served by gas utility companies who obtain the bulk of their supply from pipeline transmission companies. In some instances, pipeline transmission companies sell supplies directly to the ultimate consumer. The data regarding sales to ultimate consumers is available annually from the Bureau, AGA, and FPC, with supplemental information from Brown's, Plant Factors, and Main Line. Such information permits analysis of natural gas consumption by major consumer sectors on a State and, in some cases, a municipal basis.

The Bureau reports the annual consumption of natural gas in each State for the following consumer sectors:

1. Residential
2. Commercial
3. Industrial
4. Electric utilities
5. Other consumers (municipalities and public authorities)

The Bureau's data shows the total volume of natural gas consumed, the total number of residential and commercial customers, and the value of the gas sold by utilities as well as non-utilities (direct sales from pipelines or producers).

The AGA also shows consumption on a State basis, however, AGA data reports utility sales only. Direct sales from pipeline companies to consumers are not reported. The AGA does provide industrial natural gas consumption data for some 27 industrial classifications, similar to the Standard Industrial Classification (SIC). Excluding Bureau of

Census data, this is the only source for annual information classified in this manner.

The FPC reports interstate pipeline sales to ultimate consumers in categories similar to the Bureau.

Brown's Directory provides detailed consumption information for many individual municipalities served by municipal utilities and transmission companies, but data are often combined for cities and towns served by the same gas utility company. Consequently, consumption information for a number of the large cities is grouped with that of other municipalities of various sizes located both within and outside of the same AQCR, and in some cases, data for major industrial centers located in different AQCR's have been combined. The NCA Main Line report, prepared from FPC Form No. 2, shows the industrial customers of pipeline transmission companies.

The Plant Factors annually shows the name and location of fossil fueled electric powerplants and reports the volumes and costs of natural gas as well as other fuels consumed annually by the respective plants. In addition, the report shows the capacity and fuel use of the new conventional steam plants and other gas consuming power generation systems planned or under construction through 1975. Plant Factors is prepared from FPC Forms No.'s 1, 1-M, and 12. The NCA reports will be used for programing; however, data will be corroborated with appropriate FPC forms.

The following table summarizes the type of consumption data reported by the five sources. The consumption data may represent partial or complete coverage.

Source	State	Communities	Specific Consumer-Use 1/
Bureau of Mines	X		a,d,e,h,i,j
American Gas Association	X		a,d,e,h,j
Brown's Directory		2/ X	b,c,d,f,g,h
Federal Power Commission		X	a,d,e,h
Steam & Electric Plant Factors		X	i

1/ a. Residential
b. Residential without gas heat
c. Residential with gas heat
d. Commercial
e. Industrial
f. Industrial firm sales
g. Industrial interruptible sales
h. Other, sales to municipalities and public authorities
i. Electric utilities
j. Transportation-pipeline transmission fuel

2/ Although information is provided on an individual community basis in many cases, only combined data are shown for a number of municipalities served by the same gas utility company.

No natural gas consumer data is collected annually on an AQCR basis. It is possible, nevertheless, to make consumption estimates for those AQCR's that correspond geographically with the municipal consumption information.

The apparent impossibility of breaking out natural gas consumption information for a number of the major AQCR's from current data sources, indicates the need for new data collection procedures. Collecting information on an AQCR basis will require the cooperation of the various natural gas suppliers and distributors that provide data to the Bureau.

Generally, any significant expansion of the Bureau's data collection procedures will require approval of the Office of Management and Budget.

Data Sources Collection Procedures

Federal Power Commission--The FPC distributes three forms or their alternates to interstate gas companies. Answers to these questionnaires form the basis for several FPC publications.

Form No. 2 is completed annually by Class A and B natural gas companies (or Form No. 2-A for Class C and D companies). 1/

The completed forms for a calendar year are returned to the FPC by about May 1. The statistics are entered on punched cards and on magnetic tape. The cards are used to assemble data for two publications. The tape is available for sale. One of the two publications, "Sales by Producers of Natural Gas to Interstate Pipeline Companies," shows details on sales of about 70 percent of all natural gas produced and marketed in the United States. This volume is available from the FPC about 16 months after the close of the reported year.

The second annual publication by the FPC, and based on the response to Form No. 2, is "Statistics of Interstate Natural Gas Pipeline Companies." This volume shows financial and operating statistics for Class A and B interstate pipeline companies in the United States. It is available from the FPC in 10 to 12 months after the end of the reported year.

1/ Based on annual gas operating revenues: Class A--more than $2.5 million; Class B--$1 to $2.5 million; Class C--$150,000 to $1 million; and Class D--$25,000 to $150,000.

FPC Form No. 11 is entitled "Monthly Statement--Natural Gas Interstate Pipeline Company." The completed forms are received from all "reporting" interstate pipeline companies as shown on Table 5 of the report form. As of December 1969, the companies required to file the monthly report comprised 34 of the 109 interstate companies. Questions asked by the monthly Form No. 11 concern income, revenue, sales, numbers of customers, and operation and maintenance expense.

Two tables, regularly prepared from Form No. 11, appear once each month in the weekly publication, "FPC News." The tables are entitled "Receipts and Disposition of Gas," and "Operating Revenues and Incomes." The tables show monthly data and totals for the moving twelve-month period just ended.

FPC Form No. 15 is entitled "Natural Gas Companies Annual Report of Gas Supply of (company name) to the Federal Power Commission for the Year Ended ____." The report is filed by interstate gas companies having reserves of 50 billion cubic feet or more. Other companies file an abbreviated form (No. 15-A).

The forms are submitted to the FPC by May of each year. An annual report entitled "The Gas Supplies of Interstate Natural Gas Pipeline Companies," is compiled by about October 1 and published about April 1, or 15 months after the close of the year reported. The forms contain gas reserve (supply) data by company from each field or source of supply, but the publication summarizes the data by company without the breakdown by field or source of supply.

A magnetic tape containing all Form 15 statistics is prepared by FPC and is available for sale about 12 months after the yearend.

The statistics in FPC publications generally represent only that portion of natural gas that is defined as interstate by the Natural Gas Act. A comparison made by the FPC of its data versus the combined interstate plus intrastate data of the AGA shows that in 1968, natural gas companies under FPC jurisdiction had about 72 percent of U.S. reserves and accounted for about 69 percent of U.S. production.

FPC Form No. 301-B entitled "Independent Producers Report" is filed annually by producers of natural gas selling annually 2 million Mcf or more under filed FPC gas rate schedules. The form names the purchaser to whom the producer sells, the point of delivery, price, and quantity sold.

In at least one instance (monthly tabulation of "Receipts and Disposition of Gas," appearing in the FPC News), statistics published by the FPC include only major interstate natural gas pipeline companies, not all interstate companies. The tables are titled to show this distinction. The number of interstate companies included in a tabulation may be only 33 of the 127 total, but these major companies represent about 97 percent of the total interstate volumes bought and sold.

U.S. Bureau of Mines--The Bureau solicits natural gas supply and disposition information from natural gas companies by means of three questionnaires. The companies are asked to make a separate response for each State in which they operate. The result is a breakdown by company and State of every question asked on the three Bureau of Mines questionnaires. However, in contrast with FPC data which is public information required of natural gas operators by law, Bureau questionnaires are completed and returned voluntarily. The detailed company information is not revealed outside the Department of Interior. Such detailed information is combined with other company information to provide State totals.

One of the questionnaires, Form 1340-A, is distributed to all companies and municipalities having gas distribution facilities but not production facilities or interstate movements of gas. Form 1341-A solicits information on supply and disposition of natural gas from all companies having either production facilities or interstate movements. The third form, No. 1343-A, is sent to all companies having natural gas processing facilities.

The responses to the Bureau questionnaires are summarized by States and published annually in a series of tables in the "Mineral Industry Survey, Natural Gas Annual." Some of the tables in this publication are from sources other than the Bureau.

Natural gas supply tables in the "Mineral Industry Surveys" report total U.S. natural gas production and consumption. However, the tables do not show a breakdown of interstate and intrastate data.

The following information is reported in the various tables.

Table 1. Gross withdrawals and disposition of natural gas in the U.S. (million cubic feet)

1. Gross withdrawals

    a. from gas wells
    b. from oil wells
    Total

2. Disposition

    a. marketed production
    b. repressuring
    c. vented and flared

Table 2. Quantity and value of marketed production of natural gas in the U.S.

1. Quantity (Mmcf)

2. Value (thousand dollars)

3. Average wellhead value (cents per Mcf)

Table 3. Marketed production, interstate shipments, and total consumption of natural gas in the U.S. (Mmcf)

1. Marketed production

2. Interstate movements

    a. receipts
    b. deliveries

3. Net receipts or deliveries

4. Changes in underground storage

5. Transmission loss and unaccounted

6. Consumption

Table 4. Production of natural gas liquids at natural gas processing plants and distribution of residue gas in the U.S. (Mmcf and thousand barrels)

1. Total natural gas liquids and ethane production

Table 4. Cont'd.

2. Natural gas processed

3. Extraction loss

4. Disposition of residue

   a. used at plants
   b. returned to formation
   c. vented or flared
   d. shipped to transmission companies
   e. direct deliveries to consumers
   f. unaccounted for
   g. total

Table 5. Consumption of natural gas by use and by State (Mmcf and dollars)

1. Delivered to consumers

   a. quantity
   b. value

2. Extraction loss

   a. quantity
   b. value

3. Lease and plant fuel

   a. quantity
   b. value

4. Pipeline fuel

   a. quantity
   b. value

5. Total

   a. quantity
   b. value

Table 6. Quantity and value of natural gas delivered to consumers by type of consumer and by State (Mmcf and dollars)

1. Residential

   a. number of consumers
   b. quantity
   c. value

Table 6. Cont'd.

2. Commercial

   a. number of consumers
   b. quantity
   c. value

3. Industrial

   a. quantity
   b. value

4. Electric utilities

   a. quantity
   b. value

5. Other consumers

   a. quantity
   b. value

6. Total

   a. quantity
   b. value

Table 7. Interstate pipeline movements of natural gas in the U.S. (billion cubic feet)

1. New receipt or delivery

2. Moved from (receipts)

   a. State
   b. quantity

3. Moved to (deliveries)

   a. State
   b. quantity

Table 8. Natural gas stored underground in and withdrawn from storage fields (Mmcf)

1. Total stored

2. Total withdrawn

3. Net stored

Table 9. Underground storage statistics (at yearend) (Mmcf)

1. Number of pools
2. Number of wells
3. Total gas in storage reservoirs
4. Total reservoir capacity

Table 10. Gas wells and condensate wells in the U.S. (numbers of wells)

1. Completed during year
2. Producing at yearend

Table 11. Estimated proved recoverable reserves of natural gas in the U.S. at yearend (Mmcf)

1. Non-associated
2. Associated-dissolved
3. In underground storage
4. Total

Table 12. Estimated productive capacity of natural gas in the U.S. at yearend (Mmcf per day)

1. Productive capacity
2. Non-associated
3. Associated-dissolved
4. Total

American Gas Association, Inc.--The questionnaire used by AGA to acquire natural gas statistics is entitled "Uniform Statistical Report--Year Ended December 31, 19__." Response to the annual questionnaire reportedly represents 97 percent of the natural gas

industry are obtained by AGA from conservation or regulatory commissions and investigations of other secondary sources.

The AGA publishes an annual statistical report based on their questionnaire, "Gas Facts - A Statistical Record of the Gas Utility Industry." "Gas Facts" is available about 9 months after the end of the reported year.

The AGA prepares natural gas reserves estimates which are published in "Reserves of Crude Oil, Natural Gas Liquids and Natural Gas in the United States and Canada, and United States Productive Capacity." These reserves data are published jointly by the American Petroleum Institute (API), the Canadian Petroleum Association (CPA), and the AGA. The joint publication on natural gas reserves is available about 5 months following the year reported.

In addition to the above published reports, the AGA has made available to the Bureau of Mines some additional data which are collected via the questionnaire but are not published.

The AGA annually publishes long term projections of gas utility and pipeline industry operating statistics. Such projection shows the sales and number of customers by consumer categories for nine geographic regions for one-year intervals through 1975 and thereafter at five-year intervals through 1990.

"Brown's Directory of North American Gas Companies"--This publication shows statistics of gas distribution and pipeline companies

of the U.S. and Canada. The 84th Edition, covering 1969 statistics, was available in October 1970. The publisher is Harcourt, Brace, and Jovanovich. The book makes no distinction between interstate and intrastate gas in its statistics. In most instances, the publication combines gas distribution data for all the municipalities served by a gas utility company. It usually does not show the gas distributed to each municipality separately.

American Association of Petroleum Geologists, Inc.--Each year the June issue of the monthly AAPG Bulletin includes statistics on North American drilling activity for the previous year. These data include exploratory drilling for gas, both numbers of wells and footage drilled. The statistics are broken down by geographic regions, States, and counties. The numbers of producing wells, not shown in the AAPG publication, are available from the AGA.

The National Coal Association--"Steam & Electric Plant Factors" and "Main Line"--These two annual publications are prepared from FPC data. The format of the reports should be helpful for AQCR data programing.

Table 1 of "Plant Factors" shows the gas consumed as fuel by each plant, the fuel cost, and the Btu per cubic foot of fuel used. Table 4 shows the capacity and the type of fuel required for each new steam-electric generating plant planned or under construction during the period 1969-1975. Table 8 lists by regions (New England, Middle Atlantic, East North Central, etc.) the average number of Btu's required to produce one kilowatt-hour of electricity using coal, oil, and gas.

Table 4 of "Main Line" shows the location of the consumer, the type of industry being served, the type of gas sales, the price and the volume of sales.

State Utility Commissions--The public utility commissions of 10 States producing 97 percent of total U.S. natural gas were canvassed by the Bureau to determine what these regulatory bodies could furnish on a regular basis about intrastate gas. The amount of information available in a form suitable for our needs regarding sales volumes, shipments, prices, consumption, reserves, and storage of intrastate gas available from these agencies is not significant.

Future Natural Gas Requirements of the U.S.--The Future Requirements Committee, an industry-sponsored agency, publishes an estimate of future market demands for natural gas on a biennial basis. The committee's forecasts are compiled from basic data obtained from reporting participants representing about 95 percent of the total estimated gas requirements of the U.S., and not less than 90 percent in any one region. Each company is furnished detailed instructions for completing the forms so that the same factors will be considered by all respondents in making the forecasts.

Completed work forms are reviewed by regional work committees which examine all data and estimate the requirements of non-reporting companies. Before the information is published, a final review of all forecasts is made by the Future Requirements Agency.

The publication reports projections of natural gas requirements one, two, five, ten, fifteen, and twenty years in the future. Projections

are made for each State, for each of 11 geographic regions of the U.S., and for total U.S. requirements. In all cases the projections are shown for the following consumer groups:

1. Residential
2. Commercial
3. Industrial
4. Interruptible
5. Other
6. Total

The possibility of publishing data by Standard Metropolitan Statistical Areas (SMSA), which may correspond in many instances with the AQCR's, is being studies by the Future Requirements Committee, but this breakdown of information will not be presented in the next biennial report in 1971.

Bureau of the Census, U.S. Department of Commerce--Every five years the Census Bureau publishes a statistical summary of the Census of Manufactures which provides the most recent Census statistics on fuels consumed by industrial establishments. The results of the 1967 census were published in late 1970. The principal value of the census data is the breakdown of industrial gas consumption by Standard Industrial Classification and by SMSA's.

Annually, about mid-year, the Oil and Gas Journal, published weekly by the Petroleum Publishing Company, provides a survey of the gas processing plants in the United States. The data includes the geographic location of the plants, the capacity of the individual plants,

and the average daily natural gas throughput and production. The information, coupled with gas processing and gas analysis data available from the Bureau, indicates among other things, the amount of natural gas not processed and the source and quantities of such supplies. The data will help identify the possible consumers of sulfur-bearing natural gas supplies.

The Bureau of Labor Statistics--BLS publishes price information on natural gas. At the wholesale level, prices paid by pipeline companies to producers are available in the BLS monthly report, "Wholesale prices and price indexes." BLS has an arrangement with AGA whereby AGA polls 19 of its interstate pipeline members who account for approximately 60 percent of the gas transmitted interstate. From these data obtained from the American Gas Association, the BLS publishes a monthly national index. The index is based on 1957-1959 = 100; however, beginning with the release of data for January 1971, the index base was changed to 1967 = 100.

At the retail level, the BLS coverage is much more extensive as the data are used to develop the Bureau's Consumer Price Indexes for 23 cities. Pricing information for fuels is collected for 56 cities every month by BLS. In 55 cities, the information covers the price of gas used for cooking and waterheating. In 51 cities, the information collected includes the price of residential gas used for heating, cooking, and waterheating, and all of this information is used by BLS to construct the Consumer Price Index.

Similar to the Wholesale Price Index (WPI), the Consumer Price Index (CPI) has been changed from 1957-1959 = 100 to 1967 = 100 base. Also similar to the WIP, BLS publishes in its United States city average CPI an index for gas in the monthly BLS publication, "The Consumer Price Index." The national index, i.e. the United States city average, includes prices from the 23 SMSA's for which separate indexes are published in the monthly report. In addition to the 23 SMSA's published in the report, there are another 33 locations so that 56 locations over all are used in construction of the national average.

From data collected for the consumer price index, BLS has developed a monthly report, "Retail Prices and Indexes of Fuels and Electricity." In addition to national averages, this report provides in Table 5 monthly bills for uses of gas other than heating for 23 SMSA's including Honolulu, Los Angeles, and San Diego. Table 5A offers average prices of residential heating gas for 20 of the principal SMSA's and omits the 3 warm-region SMSA's mentioned above.

Canadian Natural Gas Data--Some of the many available sources of information on Canadian natural gas were examined in view of the importance of Canada as a source of natural gas supplies.

Five sources of Canadian information were examined in some detail. These sources show sales by consumer categories as well as reserves, production, distribution, etc.

The sources reviewed are:

1. Canadian Petroleum Association
   "Statistical Yearbook"

2. Canadian Gas Association
   "Statistical Summary"

3. Dominion Bureau of Statistics
   "Crude Petroleum and
   Natural Gas Production

4. Mineral Resources Branch
   Department of Energy, Mines,
   and Resources
   "Natural Gas Processing
   Plants in Canada"

5. Dominion Bureau of Statistics
   "Sales of Manufactured and
   Natural Gas"

APPENDIX "B"

TABULATION OF DATA BANK INPUTS

The availability of natural gas data from various sources is illustrated herein in tabular form. The tables show the sources of the information, the geographical unit (area for which the information is representative), and indicates whether the data refers to interstate gas, intrastate gas, or gas of indeterminate classification (data which makes no distinction between intrastate and interstate natural gas).

Data Headings--The natural gas availability data are tabulated under thirteen subject headings, each one having a section number as follows:

Natural Gas Data	Section Number
Natural gas reserves	I
Systems deliverability	II
Deliverability of sources	III
Gas well drilling	IV
Natural gas production and wells	V
Manufactured and mixed gas	VI
Products extraction	VII
Gas received by natural gas companies	VIII
Transportation and storage	IX
Natural gas deliveries	X
Gas company employees and payroll	XI
Data published less frequently than annually	XII
Canadian data	XIII

Under each subject heading in the tabulations is listed the items of related information for which a source is available. For example, under natural gas reserves is listed reserves by States, reserves by geologic age, etc. A further breakdown under each of these

items shows the nature of the details which are available in the source reference:

Types of Natural Gas--The tabulation is coded to indicate whether the gas supply concerns interstate gas, intrastate gas, or gas of indeterminate or mixed classification.

Geographic Coverage--The unit of geographical area covered by the source of information is shown by a code letter placed in the proper column under one of the following headings:

U.S. total

State total

State-company total
(company totals by States)

Company total

Area, plant, or transmission
system total.

In some cases, totals for larger areas must be obtained by inferrence from small units. Where a U.S. total is shown on the tabulation to be available, it might be determinable only by adding State totals. For example, the letter A appearing in the columns headed "U.S. total" and "Company total" for an item of information would mean that the information is available by company totals with U.S. totals either included or inferrable.

Source of Data--The agencies and organizations responsible for the principal source documents for natural gas information are shown, abbreviated, at the headings of each table. Each organization is assigned a code letter which is used throughout the tabulations to identify that organization.

Organization	Letter Code
Federal Power Commission	A
U.S. Bureau of Mines	B
Brown's Directory	C
American Gas Association	D
Other	E

A footnote number is used to show the specific page number of the form or publication where the listed information can be found. These footnotes and their references are listed separately on a page entitled "Footnotes." When the same information is available from more than one source, the footnotes indicate all of the sources.

Footnotes

Natural Gas Information Tabulation

1. FPC, Form 15, Schedule 1
2. FPC, Form 15, Schedule 2
3. FPC, Form 15, Schedule 3
4. FPC, Form 11, Table 2
5. FPC, Form 2, Page 558
6. FPC, Form 2, Page 568
7. FPC, Form 11, Table 3
8. FPC, Form 2, Page 569
9. FPC, Form 2, Page 559
10. FPC, Form 2, Pages 556-557
11. FPC, Form 2, Page 562
12. FPC, Form 2, Page 560
13. FPC, Form 2, Page 207-A
14. FPC, Form 2, Page 566
15. FPC, Form 2, Page 571
16. FPC, Form 15, Page XV
17. FPC, Form 2, Page 565
18. FPC, Form 2, Pages 547-548
19. FPC, Form 2, Pages 550-551
20. FPC, Form 2, Page 564
21. FPC, Form 2, Page 563
22. FPC, Form 2, Pages 554-555
23. USBM, Form 1340-A
24. USBM, Form 1341-A
25. USBM, Form 1343-A
26. FPC, Form 2, Pages 527-532
27. AGA, A/, Pages 120 and 126
28. AGA, A/, Page 121
29. AGA, A/, Page 122
30. AGA, A/, Page 174
31. AGA, A/, Page 175
32. AGA, A/, Pages 176-219
33. AGA, A/, Page 220
34. AGA, A/, Pages 221-264
35. AGA, A/, Page 265
36. Brown's Directory
37. FPC, Form 15, Page 0007
38. FPC, Form 2, Page 541
39. FPC, Form 2, Page 537
40. FPC, Form 2, Page 535
41. FPC, Form 2, Page 534
42. FPC, Form 2, Page 523
43. FPC, Form 2, Page 516
44. FPC, Form 2, Page 518
45. FPC, Form 2, Page 519, or Main Line
46. FPC, Form 2, Page 521
47. FPC, Form 2, Page 524
48. FPC, Form 2, Page 532
49. FPC, Form 2, Page 539
50. FPC, Form 2, Page 542
51. FPC News
52. AGA Printout of Gas Facts
53. AAPG Bulletin, North American Developments Issue
54. National Coal Association, Steam-Electric Plant Factors

54a. FPC, Form 1

55. USBM Mineral Industry Surveys
56. Louisiana Offshore Oil Scouts Assoc.
57. USGS, Outer Continental Shelf Statistics, 1969, page 62
58. Future Natural Gas Requirements of the United States, Future Requirements Committee of the Gas Industry Committee
59. Fuels & Electric Energy Consumed in Manufacturing Industries, U. S. Dept. of Commerce, Bureau of the Census
60. Potential Supply of Natural Gas in the United States, Potential Gas Committee, Mineral Resources Institute
61. U.S. Bureau of Labor Statistics
62. Analyses of Natural Gases, U. S. Bureau of Mines, Information Circulars
63. FPC, Form 301-B
64. Oil & Gas Journal

A/ Reserves of Crude Oil, Natural Gas Liquids, and Natural Gas in the United States and Canada, and United States Productive Capacity as of December 31, 1969, Vol. 24, May 1970, published jointly by: American Gas Association, Inc., American Petroleum Institute, and Canadian Petroleum Association.

NDI

SECTION I	Coverage			Information breakdown				
Natural Gas Reserves	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
1. Proved recoverable reserves								
a. non-associated gas								
beginning of year			D 28	D	D			
extensions during year			D 28	D	D			
revisions during year			D 28	D	D			
new field discoveries			D 28	D	D			
new reservoir discoveries			D 28	D	D			
production during year			D 28	D	D			
end of year reserves								
b. associated-dissolved gas								
beginning of year			D 29	D	D			
extensions during year			D 29	D	D			
revisions			D 29	D	D			
new field discoveries			D 29	D	D			
new reservoir discoveries			D 29	D	D			
production during year			D 29	D	D			
end of year reserves								
c. total gas reserves								
beginning of year			D 27	D	D			
extensions during year			D 27	D	D			
revisions			D 27	D	D			
new field discoveries			D 27	D	D			
new reservoir discoveries			D 27	D	D			
net change, underground storage			D 27	D	D			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

END 3

SECTION 1 Natural Gas Reserves (con'd)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or syster total
1.c. end of year reserves			D 27	D	D			
non-associated gas			D 27	D	D			
associated-dissolved gas			D 27	D	D			
underground storage gas			D 27	D	D			
Total reserves			D 27	D	D			
2. Total dedicated reserves, entire company system								
a. owned reserves	A 1			A			A	
b. contracted reserves	A 1			A			A	
c. warranty contract reserves	A 1			A			A	
d. pipeline purchases reserves	A 1			A			A	
Total reserves	A 1			A			A	
3. Details of dedicated remaining recoverable salable natural gas reserves of interstate gas companies								
a. location of reserves by:								
State	A 3			A	A	A	A	A
county	A 3			A	A	A	A	A
production area (FPC)	A 3			A	A	A	A	A
field	A 3			A	A	A	A	A
geologic system	A 3			A	A	A	A	A
depth	A 3			A	A	A	A	A
offshore, Federal/State	A 3			A	A	A	A	A

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION I	Coverage			Information breakdown				
Natural Gas Reserves (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area plan or syst tota
b. type of reserves								
associated gas reserves	A 3			A	A	A	A	A
non-associated gas reserves	A 3			A	A	A	A	A
combination gas reserves	A 3			A	A	A	A	A
4. In addition: Potential reserves supply;								
a. probable reserves			E 60	E				
b. possible reserves			E 60	E				
c. speculative reserves			E 60	E				
5. Analyses of natural gases			E 62					E

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North America Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

END

SECTION II	Coverage			Information breakdown				
Systems Deliverability	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or syster total
1. Volume of gas purchased and/or produced, current year								
a. owned gas	A 1			A			A	
b. contracted gas	A 1			A			A	
c. warranty contract gas	A 1			A			A	
d. pipeline purchases gas	A 1			A			A	
2. Deliverability forecast, company system total, annually for 20 years future								
a. owned & contracted gas	A 1			A			A	
b. pipeline purchases	A 1			A			A	
c. future additions	A 1			A			A	
d. total deliverabilities	A 1			A			A	
e. annual requirements	A 1			A			A	
3. Volumes scheduled								
a. owned & contracted	A 1			A			A	
b. pipeline purchases	A 1			A			A	
c. future additions	A 1			A			A	
d. total pipeline system	A 1			A			A	
e. annual requirements	A 1			A			A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION II Systems Deliverability (See also Section X, Natural Gas Deliveries)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or syster total
4. Remaining reserves, after 20 years								
a. owned & contracted	A 1			A			A	
b. pipeline purchases	A 1			A			A	
c. total pipeline system	A 1			A			A	
5. Percent of total annual volume purchased and/or produced								
a. firm sales	A 1			A			A	
b. interruptible sales	A 1			A			A	
c. company use	A 1			A			A	
6. Reserve life index, total reserves/ annual requirements	A 1&37			A			A	
7. Deliverability life, in years	A 37			A			A	
8. Average annual system requirements, Mcf	A 37			A			A	
9. System peak delivery rates								
a. highest day of year	A 17			A	A	A	A	A
b. second highest day	A 17			A	A	A	A	A
c. third highest day	A 17			A	A	A	A	A
d. highest consecutive 3 days	A 17			A	A	A	A	A
e. highest month	A 17			A	A	A	A	A
(1) date	A 17			A	A	A	A	A
(2) delivery rate to FPC customers	A 17			A	A	A	A	A
(3) delivery rate, non-FPC customers	A 17			A	A	A	A	A

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION III	Coverage			Information breakdown				
Deliverability of Sources	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or syste total
1. Sources of supply								
a. name of source	A 2			A			A	
b. location of source								
(1) production area (FPC)	A 2			A			A	
(2) State	A 2			A			A	
(3) county	A 2			A			A	
(4) onshore/offshore area	A 2			A			A	
c. type of source								
(1) field	A 2			A			A	
(2) field area	A 2			A			A	
(3) plant	A 2			A			A	
(4) pipeline	A 2			A			A	
(5) miscellaneous	A 2			A			A	
(6) import	A 2			A			A	
(7) contract area	A 2			A			A	
(8) warranty contract area	A 2			A			A	
2. Reserves owned and contracted								
a. volume purchased and/or produced	A 1&2			A			A	
b. total volume scheduled	A 2			A			A	
c. maximum daily volume available	A 2			A			A	
d. Btu per cubic feet, average	A 2			A			A	
e. daily productive capacity								
(1) non-associated gas	A 2		D 35	A	D		A	
(2) associated & solution gas	A 2		D 35	A	D		A	
(3) total daily capacity	A 2		D 35	A	D		A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

END

SECTION IV	Coverage			Information breakdown				
Gas Well Drilling	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or syster total
1. Drilling activity, wells completed as gas producers								
a. exploratory wells, number of wells and footage drilled,								
(1) new field drilling				E 53	E			
(2) new pool drilling				E 53	E			
(3) deeper pool drilling				E 53	E			
(4) shallower pool drilling				E 53	E			
(5) estension (outpost) drilling				E 53	E			
b. development wells completed								
(1) number of wells				E 53	E			
(2) footage drilled				E 53	E			
2. Numbers of new gas field discoveries proved after 6 years to be of significant size								
a. total gas wells reported at end of year of completion				E 53				
b. no. of fields of each size category after 6 years of development history				E 53				
c. total no. of significant fields				E 53				
d. percent of field discoveries which were significant size				E 53				
e. total new field wildcats drilled								
(1) percent of significant gas finds in total new field wildcats drilled				E 53				

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION V	Coverage			Information breakdown				
Natural Gas Production & Producing Wells	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
1. Natural gas production, annual volumes								
a. non-associated gas	A 6		B 24	A,B	B	B	A,B	
b. associated-dissolved gas	A 6		B 24	A,B	B	B	A,B	
c. total production	A 6		B 24	A,B	B	B	A,B	
2. Natural gas production, cumulative volumes								
a. non-associated gas			D 33	D	D			
b. associated-dissolved gas			D 33	D	D			
c. total cumulative			D 33	D	D			
3. Natural gas production from company operated wells								
a. gas and condensate wells			B 24	B	B	B	B	
b. oil wells			B 24	B	B	B	B	
4. Natural gas production								
a. monthly volumes	A 51			A				
b. 12 consecutive month volume	A 51			A				
5. Marketed production								
a. quantity, Mcf			B 55	B	B			
b. value, dollars			B 55	B	B			
c. average wellhead value, cents/Mcf			B 55	B	B			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

AMENDED

SECTION V Natural Gas Production & Producing Wells (con'd)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
6. Number of wells producing or capable of producing, by each of following categories;								
Gas wells (non-associated)	A 5			A	A	A	A	A
Oil wells (associated-dissolved)	A 5			A	A	A	A	A
Combination (dual) wells	A 5			A	A	A	A	A
a. no. producing, beginning of year	A 5			A	A	A	A	A
b. no. drilled during year	A 5			A	A	A	A	A
c. no. purchased during year	A 5			A	A	A	A	A
d. total additions	A 5			A	A	A	A	A
e. no. reclassified	A 5			A	A	A	A	A
f. no. abandoned	A 5			A	A	A	A	A
g. no. sold	A 5			A	A	A	A	A
h. total reductions	A 5			A	A	A	A	A
i. no. wells @ yearend	A 5			A	A	A	A	A
(1) gross	A 5			A	A	A	A	A
(2) net, company interest	A 5			A	A	A	A	A
7. Offshore natural gas production, annually by States								
a. State offshore			E 57	E	E			
b. Federal OCS			E 57	E	E			
8. Offshore producing gas wells by fields, Louisiana			E 56		E			E
9. Offshore cumulative gas production by fields, Louisiana			E 56		E			E

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION VI	Coverage			Information breakdown				
Manufactured & Mixed Gas	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
1. Manufacturing plants								
a. location, city and State	A 21			A	A	A	A	A
b. volume of gas produced	A 21		C 36	A,C	A	A	A,C	A
c. type of process used								
(1) coke oven	A 21			A	A	A	A	A
(2) water gas	A 21			A	A	A	A	A
(3) other	A 21			A	A	A	A	A
d. net company interest	A 21			A	A	A	A	A
e. average Btu content of gas	A 21			A	A	A	A	A
f. operating expense, annual	A 21			A	A	A	A	A
g. volume of manufactured gas mixed with natural gas, annually, monthly, 12 months	A 21		D 52	A,D	A,D	A	A	A,D
h. type of gas manufactured for standby and peak shaving			C 36	C			C	
i. manufactured gas operating revenues	A 1			A			A	
2. Supply of manufactured, mixed, and liquefied gas to public utilities which distribute mixed gas								
a. production of manufactured gas by gas utilities			D 52	D	D			
b. production by gas utilities of natural gas used for enriching			D 52	D	D			
c. production of LPG by gas utilities			D 52	D	D			
d. manufactured gas purchased from non-utilities			D 52	D	D			
e. natural gas purchased for mixing			D 52	D	D			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX B

SECTION VI	Coverage			Information breakdown				
Manufactured & Mixed Gas (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
3. Disposition of manufactured, mixed, and liquefied gas by public utilities which distribute mixed gas								
a. used by companies as fuel			D 52	D	D			
b. sales to ultimate consumers			D 52	D	D			
c. unaccounted for			D 52	D	D			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

VII Products Extraction	Coverage			Information available in				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
1. Total gas processed for extraction and recovery of natural gas liquids	A 22		E 64 B 25	E A,B	E B	E B	E A,B	E
2. Extraction loss (shrinkage) of gas processed for recovery of natural gas liquids	A 22		B 25	A,B	B	B	A,B	A
3. Volume of residue gas from processing of natural gas to recover liquids	A 22		B 25	A, B	B	B	B	
4. Disposition of residue gas from natural gas liquids processing plants; volumes,								
a. used as plant fuel	A 22		B 25	A,B	B	B	A,B	A
b. used in lease operations for power, heat, gas lift			B 25	B	B	B	B	
c. returned to formation for repressuring, pressure maintenance, recycling			B 25	B	B	B	B	
d. delivered directly to consumer			B 25	B	B	B	B	
e. delivered to pipeline companies including own company-operated lines			B 25	B	B	B	B	
f. vented and flared			B 25	B	B	B	B	
g. unaccounted for			B 25	B	B	B	B	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION VII	Coverage			Information breakdown				
Products Extraction (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
5. Capacities of natural gas liquids recovery plants								
a. gas treating capacity, Mcf/day	A 22			A			A	A
b. gasoline output, gallon/day	A 22			A			A	A
c. gasoline storage capacity, gallon	A 22			A			A	A
6. Average Mcf per gallon of gasoline recovered	A 22			A			A	A
7. Total expense per gallon of product recovered	A 22			A	A	A	A	A

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION VIII	Coverage			Information breakdown				
Gas Received by Natural Gas Companies (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
1. Natural gas production (See Section V)								
2. LPG mixed with natural gas; volumes, expenses, plant locations	A 20			A	A	A	A	A
3. Manufactured gas produced and mixed with natural gas volumes	A 21		D 52	A,D	D		A	
4. Natural gas purchased from each vendor								
a. name of vendor	A 40			A	A	A	A	
b. point of receipt	A 40			A	A	A	A	
c. Btu per cubic foot	A 40			A	A	A	A	
d. volume purchased	A 40			A	A	A	A	
e. total cost	A 40			A	A	A	A	
f. cost per Mcf	A 40			A	A	A	A	
(1) wellhead purchases	A 40			A	A	A	A	
(2) field line purchases	A 40			A	A	A	A	
(3) gasoline plant outlet purchases	A 40			A	A	A	A	
(4) transmission line purchases	A 40			A	A	A	A	
(5) city gate purchases	A 40			A	A	A	A	
(6) other (not natural gas) purchases	A 40			A	A	A	A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION VIII	Coverage			Information breakdown				
Gas Received by Natural Gas Companies (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
5. Natural gas purchased from								
a. producing companies in State			B 23&24	B	B	B	B	
b. pipeline companies in State			B 23&24	B	B	B	B	
c. domestic sources outside State			B 23&24	B	B	B	B	
6. Total natural gas purchased annually, volume & dollars, monthly & 12 months	A 51		C 36	A,C			C	
7. Receipts of company-owned gas transported or compressed by others	A 6			A			A	
8. Exchange gas received								
a. name of source company	A 39			A			A	
b. point of receipt	A 39			A			A	
c. volume received	A 39			A			A	
9. Gas withdrawn from underground storage, quantity and value, by company								
a. monthly	A 12			A			A	
b. annually	A 12&13			A			A	
c. total monthly and 12 months	A 51			A			A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION VIII Gas Received by Natural Gas Companies (con'd)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or syster total
10. Gas received from LNG storage	A 6			A			A	
11. Total gas receipts and value								
a. by company, annually	A 6		B 23&24	A,B	B	B	A,B	
b. by U. S., monthly & 12 months	A 51			A				
12. Natural gas purchases from independent producers under FPC rate schedules, by each producer;								
a. name of purchaser	A 63			A				
b. field where gas is produced	A 63			A				A
c. price, cents per Mcf	A 63			A				A
d. point of delivery	A 63			A				A
e. gross sales	A 63			A				A
f. gross revenue	A 63			A				A

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION IX	Coverage			Information breakdown				
Transportation & Storage	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
1. Field gathering system lines								
a. system name	A 9			A	A	A	A	A
b. production and name	A 9			A	A	A	A	A
c. State	A 9			A	A	A	A	A
d. total miles of pipeline	A 9			A	A	A	A	A
e. miles of each size pipe	A 9			A	A	A	A	A
2. Transmission system lines								
a. system name	A 11			A	A	A	A	A
b. State	A 11			A	A	A	A	A
c. total miles of pipeline	A 11			A	A	A	A	A
d. miles of each size pipe	A 11			A	A	A	A	A
3. Distribution system lines								
a. total miles of pipeline			C 36	C			C	
b. miles of plastic line			C 36	C			C	
c. no. of plastic services			C 36	C			C	
4. Miles of utility gas main (excludes surface pipe)								
a. field & gathering			D 52	D	D			
b. transmission			D 52	D	D			
c. distribution			D 52	D	D			
d. total			D 52	D	D			
(1) all types of gas			D 52	D	D			
(2) natural gas			D 52	D	D			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX B

SECTION IX	Coverage			Information breakdown				
Transportation & Storage (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
4. d. total								
(3) manufactured gas			D 52	D	D			
(4) mixed gas			D 52	D	D			
(5) liquefied petroleum gas			D 52	D	D			
5. Underground storage								
a. name of storage area	A 12			A	A	A	A	A
b. location	A 12			A	A	A	A	A
c. no. storage wells in project	A 12		D 52	A,D	A,D	A	A	A
d. no. acres in storage field	A 12			A	A	A	A	A
e. type of reservoir								
(1) expansion	A 12			A	A	A	A	A
(2) water drive	A 12			A	A	A	A	A
(3) aquifer	A 12			A	A	A	A	A
f. reservoir pressure at which storage capacity computed	A 12			A	A	A	A	A
g. year storage operation start	A 12			A	A	A	A	A
h. annual & monthly volumes delivered to storage	A 12		B 23&24	A,B	A,B	A,B	A,B	A,B
i. annual & monthly volumes withdrawn from storage	A 12		B 24&24	A,B	A,B	A,B	A,B	A,B
j. volume stored gas yearend	A 12		D 52	A,D	A,D	A	A	A
k. est. native gas @ yearend	A 12		D 52	A,D	A,D	A	A	A
l. total gas in reservoir, yearend	A 12		D 52	A,D	A,D	A	A	A
m. maximum 1-day withdrawal from storage, date	A 12		D 52	A,D	A,D	A	A	A
n. total miles pipe in system	A 9			A	A			
o. miles each size pipe	A 9			A	A			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX B

SECTION IX	Coverage			Information breakdown				
Transportation & Storage (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-sted	U. S. total	State total	Company total by State	Company total	Area, plant or system total
5. p. storage expenses, dollars/year								
(1) rents	A 12			A	A	A	A	A
(2) operation	A 12			A	A	A	A	A
(3) maintenance	A 12			A	A	A	A	A
q. no. of storage pools								
(1) aquifer pools			D 52	D	D			
(2) other underground			D 52	D	D			
r. maximum volume of gas in underground storage during year			D 52	D	D			
6. Storage capacity								
a. above ground capacity			C 36	C	C	C	C	C
b. underground capacity								
(1) native gas			C 36	C	C	C	C	C
(2) aquifer			C 36	C	C	C	C	C
(3) total storage capacity			C 36	C	C	C	C	C
7. Compressor stations								
a. field compressor stations	A 10			A	A	A	A	A
b. products extraction compressor station	A 10			A	A	A	A	A
c. underground storage compressor stations	A 10			A	A	A	A	A
d. transmission compressor stations	A 10			A	A	A	A	A
e. distribution compressor stations	A 10			A	A	A	A	A
f. other compressor stations	A 10			A	A	A	A	A
(1) name	A 10			A	A	A	A	A

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION IX Transportation & Storage (con'd)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undifferentiated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
7. f. (2) location	A 10			A	A	A	A	A
(a) field	A 10			A	A	A	A	A
(b) city	A 10			A	A	A	A	A
(c) State	A 10			A	A	A	A	A
(3) company net interest	A 10			A	A	A	A	A
(4) no. of employees	A 10			A	A	A	A	A
(5) annual expenses	A 10			A	A	A	A	A
(a) fuel or power	A 10			A	A	A	A	A
(b) other	A 10			A	A	A	A	A
(6) volume gas for fuel	A 10			A	A	A	A	A
(7) driving & compressor units	A 10			A	A	A	A	A
(a) total hp ratings	A 10			A	A	A	A	A
(b) no. of units	A 10			A	A	A	A	A
(c) year installed	A 10			A	A	A	A	A
g. total installed compressor horsepower-gas utilities & pipeline industry			D 52	D				
8. FPC pipeline certificate matters, for construction & operation of facilities								
a. no. of facilities	A 51			A				
b. miles of pipeline	A 51			A				
c. compressor horsepower	A 51			A				
d. estimated cost	A 51			A				
(1) pending, start of quarter	A 51			A				
(2) filed during quarter	A 51			A				
(3) issued during quarter	A 51			A				
(4) otherwise disposed of	A 51			A				
(5) pending, end of quarter	A 51			A				

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION IX	Coverage			Information breakdown				
Transportation & Storage (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
9. LPG storage capacity at plants which produce gas from LPG								
a. location of plant	A 20			A	A	A	A	A
b. storage capacity, gallons	A 20			A	A	A	A	A
10. Net interstate movements of natural gas in U. S.								
a. marketed production			B	B	B			
b. consumption			B	B	B			
c. transmission losses			B	B	B			
d. stored underground			B	B	B			
e. net interstate movements	B			B	B			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX B

SECTION X	Coverage			Information breakdown				
Natural Gas Deliveries	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
1. Sales to industrial customers other than from local distribution systems								
a. field sales. Mcf	A 45			A	A		A	
b. transmission sales, Mcf	A 45			A	A		A	
(1) subject to FPC	A 45			A	A		A	
(2) not subject to FPC	A 45			A	A		A	
(3) sales to public authority	A 45			A	A		A	
(a) name of customer	A 45			A	A		A	
(b) point of delivery	A 45			A	A		A	
(c) Btu content	A 45			A	A		A	
(d) volume sold	A 45			A	A		A	
(e) annual revenue	A 45			A	A		A	
(f) revenue per Mcf	A 45			A	A		A	
2. Sales to space heating customers								
a. residential space heating	A 44			A			A	
(1) average no. of customers	A 44		D 52	A,D	D		A	
(2) average Mcf per customer	A 44			A			A	
(3) no. customers added	A 44			A			A	
(4) unfilled applications, yearend	A 44			A			A	
3. Sales to other gas utilities and to pipeline companies for resale								
a. field sales, Mcf	A 46			A	A		A	
(1) to interstate pipeline companies for resale under FPC rate schedules	A 46			A	A		A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION X Natural Gas Deliveries (con'd)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
3. a. (2) other field sales	A 46			A	A		A	
b. transmission system sales	A 46			A	A		A	
(1) to interstate pipeline companies for resale under FPC rate schedules	A 46			A	A		A	
(2) to intrastate pipeline companies and gas utilities for resale under FPC rate schedules	A 46			A	A		A	
(3) other transmission sales	A 46			A	A		A	
(a) name of other gas utility	A 46			A	A		A	
(b) point of delivery	A 46			A	A		A	
(c) volume gas sold, Mcf	A 46			A	A		A	
(d) Btu content	A 46			A	A		A	
(e) revenue, annual	A 46			A	A		A	
(f) revenue, per Mcf	A 46			A	A		A	
(g) sum of monthly demands	A 46			A	A		A	
(h) peak day delivery	A 46			A	A		A	
4. Sales to industrial customers								
a. interruptible	A							
b. firm	A							
c. off peak	A							
d. total	A							
(1) annual volume	A 44			A			A	
(2) monthly volume & revenue	A 51			A				
(3) 12 consecutive months, volume & revenue	A 51			A				
(4) average no. of customers	A 44			A			A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX B

SECTION X	Coverage			Information breakdown				
Natural Gas Deliveries (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-sted	U. S. total	State total	Company total by State	Company total	Area, plant or system total
5. Sales within communities (excluding field and main line sales to industrial customers)								
a. name of community	A 43			A	A	A	A	
b. population	A 43			A	A	A	A	
c. Btu of gas sold	A 43			A	A	A	A	
d. annual revenue	A 43			A	A	A	A	
e. annual volume sold	A 43			A	A	A	A	
f. average no. of customers	A 43			A	A	A	A	
(1) residential sales	A 43			A	A	A	A	
(2) commercial sales	A 43			A	A	A	A	
(3) industrial sales	A 43			A	A	A	A	
(4) total sales	A 43			A	A	A	A	
6. Interdepartmental sales								
a. receiving department	A 42			A			A	
b. point of delivery	A 42			A			A	
c. volume sold	A 42			A			A	
d. revenue received	A 42			A			A	
7. Sales of manufactured & LPG gas during periods of peak demands or emergency								
a. LPG delivered			D 52	D	D			D
b. manufactured gas delivered			D 52	D	D			D
c. natural gas delivered during same periods			D 52	D	D			D

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION X Natural Gas Deliveries (con'd)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
8. Sales to individual electric power generating plants*								
a. volumes			E 54	E	E		E	
b. price per Mcf			E 54	E	E		E	
9. Sales by consumer sector								
a. volume sold			C 36	C			C	
b. average revenue per Mcf			C 36	C			C	
c. average no. on-line customers			C 36	C			C	
(1) residential, with heating			C 36	C			C	
(2) residential, no heating			C 36	C			C	
(3) commercial			C 36	C			C	
(4) firm industrial			C 36	C			C	
(5) interruptible industrial			C 36	C			C	
(6) space heating			C 36	C			C	
(7) public authority			C 36	C			C	
(8) off peak			C 36	C			C	
(9) interdepartmental			C 36	C			C	
(10) sale for resale			C 36	C			C	
(11) seasonal			C 36	C			C	
(12) irrigation			C 36	C			C	
(13) electric generation			C 36	C			C	
(14) other gas utilities			C 36	C			C	

* See also 54a.

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX B

SECTION X	Coverage			Information breakdown				
Natural Gas Deliveries (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
10. Sales volumes, revenues, No. of customers (monthly)								
a. firm industrial	A 4			A			A	
b. off peak industrial	A 4			A			A	
c. interruptible industrial	A 4			A			A	
d. other ultimate consumers	A 4			A			A	
e. total ultimate consumers	A 4			A			A	
11. Sales to intrastate gas companies								
a. under FPC rate schedule	A 51			A				
b. not under FPC rate schedule	A 51			A				
c. total intrastate	A 51			A				
(1) monthly	A 51			A				
(2) 12 consecutive months	A 51			A				
(a) volume of gas	A 51			A				
(b) dollar value	A 51			A				
(c) cents per Mcf	A 51			A				
12. Sales for resale (volume, revenue, no. customers)								
a. gas pipelines	A 4			A			A	
(1) FPC Form 11 Table 5 asterisks	A 4			A			A	
(2) FPC Form 11 Table 5 non-asterisk	A 4&51			A			A	
b. gas utilities (not Table 5)	A 4			A			A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX B

SECTION X	Coverage			Information breakdown				
Natural Gas Deliveries (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
12. b. (1) FPC rate schedule companies	A 4			A			A	
(2) non-rate schedule companies	A 4			A			A	
c. total sales for resale	A 4&51			A			A	
13. Sales of gas by companies and municipalities with gas distribution facilities but no production facilities or interstate movements								
a. deliveries directly to:			B 23	B	B	B	B	
(1) residential consumers			B 23	B	B	B	B	
(a) no. consumers @ yearend			B 23	B	B	B	B	
(2) commercial consumers			B 23	B	B	B	B	
(a) no. consumers @ yearend			B 23	B	B	B	B	
(3) industrial consumers			B 23	B	B	B	B	
(4) electric utilities			B 23	B	B	B	B	
(5) other consumers			B 23	B	B	B	B	
b. own company use			B 23	B	B	B	B	
c. stored underground			B 23	B	B	B	B	
d. unaccounted for			B 23	B	B	B	B	
e. total disposition			B 23	B	B	B	B	
14. Sales for electric power generation (excludes direct sales by producers to straight electric utilities) quantities in therms, values in dollars								
a. included in industrial sales			D 52	D	D			
b. included in other sales			D 52	D	D			
c. total sales			D 52	D	D			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX B

SECTION X	Coverage			Information breakdown				
Natural Gas Deliveries (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
14. d. transfers to electric departments of combination companies			D 52	D	D			
e. total sales & transfers			D 52	D	D			
15. Sales of gas by interstate pipeline companies and natural gas producing companies (undifferentiated)								
a. extraction losses			B 24	B	B	B	B	
b. used, lease operation, plant fuel			B 24	B	B	B	B	
c. reinjected for repressuring, cycling, pressure maintenance			B 24	B	B	B	B	
d. vented and flared			B 24	B	B	B	B	
e. used as pipeline fuel			B 24	B	B	B	B	
f. delivered to processing plants of others			B 24	B	B	B	B	
g. delivered to pipeline distributing companies;			B 24	B	B	B	B	
(1) within State			B 24	B	B	B	B	
(2) out of State			B 24	B	B	B	B	
h. delivered directly to consumers			B 24	B	B	B	B	
(1) residential			B 24	B	B	B	B	
(2) commercial			B 24	B	B	B	B	
(3) industrial			B 24	B	B	B	B	
(4) electric utilities			B 24	B	B	B	B	
(5) other consumers								
i. stored underground			B 24	B	B	B	B	
j. unaccounted for			B 24	B	B	B	B	
k. total disposition			B 24	B	B	B	B	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION X Natural Gas Deliveries (con'd)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
16. Utility & pipeline sales for resale, therms								
a. natural gas			D 52	D	D			
b. mixed gas			D 52	D	D			
c. total gas			D 52	D	D			
17. Natural, manufactured and mixed gas sales by gas utilities								
a. utility sales, therms			D 52	D	D			
b. no. of customers			D 52	D	D			
c. utility revenue, dollars			D 52	D	D			
(1) residential			D 52	D	D			
(2) commercial			D 52	D	D			
(3) industrial			D 52	D	D			
(4) other			D 52	D	D			
(5) total			D 52	D	D			
18. Revenues from utility and pipeline sales for resale								
a. natural gas revenues			D 52	D	D			
b. mixed gas revenues			D 52	D	D			
c. total gas revenues			D 52	D	D			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX B

SECTION X	Coverage			Information breakdown				
Natural Gas Deliveries (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
19. Monthly gas sales of utilities, in therms;								
a. natural gas			D 52	D	D			
b. manufactured gas			D 52	D	D			
c. mixed gas			D 52	D	D			
d. total gas			D 52	D	D			
20. System peak delivery rates								
a. highest day of year	A 17			A	A	A	A	A
b. second highest day	A 17			A	A	A	A	A
c. third highest day	A 17			A	A	A	A	A
d. highest consecutive 3 days	A 17			A	A	A	A	A
e. highest month	A 17			A	A	A	A	A
(1) date	A 17			A	A	A	A	A
(2) delivery rate to FPC customers	A 17			A	A	A	A	A
(3) delivery rate, non-FPC customers	A 17			A	A	A	A	A
21. Auxiliary facilities to meet seasonal peak demands								
a. location of facility	A 14			A	A	A	A	A
b. type of facility	A 14			A	A	A	A	A
c. maximum daily delivery capacity	A 14			A	A	A	A	A
(1) underground storage	A 14			A	A	A	A	A
(2) LPG installation	A 14			A	A	A	A	A
(3) gas liquefaction plant	A 14			A	A	A	A	A

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION X Natural Gas Deliveries (con'd)	Coverage: Inter-state gas	Coverage: Intra-state gas	Coverage: Undif-ferenti-ated	Information breakdown: U. S. total	Information breakdown: State total	Information breakdown: Company total by State	Information breakdown: Company total	Information breakdown: Area, plant or system total
21. c. (4) oil gas sets	A 14			A	A	A	A	A
(5) other	A 14			A	A	A	A	A
22. Minimum day sendout by natural gas utilities, therms	D 52			D	D			
23. Maximum day sendout by natural gas utilities, therms								
a. peak shaving facilities			D 52	D	D			
b. underground storage withdrawal (from fields operated by both distributors & pipeline companies)			D 52	D	D			
c. regular production & purchases			D 52	D	D			
d. total maximum day sendout			D 52	D	D			
24. Fuels used for production of peak shaving gas								
a. quantity used			D 52	D	D			
b. cost			D 52	D				
(1) anthracite & bituminous coal			D 52	D	D			
(2) oil			D 52	D	D			
(3) liquefied petroleum gas			D 52	D	D			
(4) other liquids			D 52	D	D			
25. Natural gas delivered to underground storage, annual volumes;			B 23&24	B	B	B	B	
26. Natural gas delivered to LNG storage	A 8			A			A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION X Natural Gas Deliveries (con'd)	Coverage: Inter-state gas	Coverage: Intra-state gas	Coverage: Undifferentiated	Information breakdown: U. S. total	Information breakdown: State total	Information breakdown: Company total by State	Information breakdown: Company total	Information breakdown: Area, plant or system total
27. Disposition of residue gas by companies having natural gas processing facilities								
a. used as plant fuel			B 25	B	B	B	B	
b. used in lease operations for power, heat, gas lift			B 25	B	B	B	B	
c. returned to formation for re-pressuring, pressure maintenance, cycling			B 25	B	B	B	B	
d. delivered directly to consumers (sales)			B 25	B	B	B	B	
e. delivered to pipeline companies including own company-operated lines			B 25	B	B	B	B	
f. vented or flared			B 25	B	B	B	B	
g. unaccounted for			B 25	B	B	B	B	
h. total disposition of residue			B 25	B	B	B	B	
28. Natural gas franchise requirements								
a. cash outlays	A 50			A			A	
b. gas delivered	A 50			A			A	
(1) volume, Mcf	A 50			A			A	
(2) value, dollars	A 50			A			A	
29. Exchange gas delivered								
a. company to whom delivered	A 39			A	A	A	A	
b. point of delivery	A 39			A	A	A	A	
c. volume delivered	A 39			A	A	A	A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

APPENDIX

SECTION X Natural Gas Deliveries (con'd)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
30. Natural gas losses								
a. extraction losses			B 24	B			B	
b. vented and flared			B 24	B			B	
c. reinjected			B 24	B			B	
d. production system losses	A 8			A			A	
e. storage losses	A 8			A			A	
f. transmission system losses	A 8			A			A	
g. distribution system losses	A 8			A			A	
h. other losses	A 8			A			A	
i. unaccounted	A 8			A			A	
31. Deliveries of gas of others transported or compressed for;								
a. other interstate pipeline companies	A 47			A	A	A	A	
b. others	A 47			A	A	A	A	
(1) company from which gas was received	A 47			A	A	AQ	A	
(2) company to which gas was delivered	A 47			A	A	A	A	
(3) points of receipt & delivery	A 47			A	A	A	A	
(4) distance transported	A 47			A	A	A	A	
(5) volume gas received	A 47			A	A	A	A	
(6) volume gas delivered	A 47			A	A	A	A	
(7) revenue received	A 47			A	A	A	A	
(8) average revenue per Mcf	A 47			A	A	A	A	
c. total gas transported or compressed for others	A 8			A			A	

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION X Natural Gas Deliveries (con'd)	Coverage: Inter-state gas	Coverage: Intra-state gas	Coverage: Undifferentiated	Information breakdown: U. S. total	Information breakdown: State total	Information breakdown: Company total by State	Information breakdown: Company total	Information breakdown: Area, plant or system total
32. Deliveries of gas for transportation or compression by others								
a. company to whom delivered	A 38			A	A	A	A	
b. company from whom received	A 38			A	A	A	A	
c. point of delivery	A 38			A	A	A	A	
d. point of receipt	A 38			A	A	A	A	
e. distance transported	A 38			A	A	A	A	
f. volume gas delivered	A 38		B 24&25	A,B	A	A	A,B	
g. volume gas received	A 38		B 24&25	A,B	A	A	A,B	
h. amount of payment	A 38			A	A	A	A	
i. payment per Mcf received	A 38			A	A	A	A	
33. Natural gas used; annually, monthly, 12 months								
a. purpose, how used	A 49			A			A	
b. volume used	A 49		B 23&24	A,B	B	B	A,B	
c. value of gas used	A 49			A			A	
d. value per Mcf of gas used	A 49			A			A	
34. Gas used by utilities in further gas production								
a. natural gas			D 52	D	D			
(1) reforming			D 52	D	D			
(2) enriching			D 52	D	D			
(3) to produce mixed gas			D 52	D	D			
b. manufactured gas								
(1) to produce mixed gas			D 52	D	D			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION X Natural Gas Deliveries (con'd)	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
34. c. liquefied petroleum gas (1) to produce mixed gas			D 52	D	D			
35. Yearly average number of customers and gas utility sales volume (excludes sales for resale) and revenues;								
a. residential			D 52	D	D			
b. commercial			D 52	D	D			
c. industrial			D 52	D	D			
d. other			D 52	D	D			
e. total			D 52	D	D			
(1) natural gas sales			D 52	D	D			
(2) mixed gas sales			D 52	D	D			
(3) manufactured gas sales			D 52	D	D			
(4) LPG sales			D 52	D	D			
(5) total gas sales			D 52	D	D			
36. Gas househeating customers								
a. no. of customers			D 52	D	D			
b. percentage of residual gas customers using gas for heating			D 52	D	D			
c. no. of gas heated housing units			D 52	D	D			
37. Normal annual heating degree days (65° F. base) for 100 selected U. S. cities			D 52					

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION X	Coverage			Information breakdown				
Natural Gas Deliveries (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
38. Expenditures, gas utility and pipeline construction, by type of facility;								
a. production & storage			D 52	D	D			
b. transmission			D 52	D	D			
c. underground storage			D 52	D	D			
d. distribution			D 52	D	D			
e. general			D 52	D	D			
f. total expenditures			D 52	D	D			
39. Average retail price index annual and quarterly								
a. gas			E 61	E				E
(1) for heating			E 61	E				E
(2) for other uses			E 61	E				E
b. electricity			E 61	E				E
c. no. 2 fuel oil			E 61	E				E
40. Annual indexes of average residential consumption and gas prices (1957-59 = 100)								
a. average therms per customer			D 52	D	D			
b. average price paid per customer per therm			D 52	D	D			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION X	Coverage			Information breakdown				
Natural Gas Deliveries (con'd)	Inter-state gas	Intra-state gas	Undifferentiated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
41. Gross withdrawals of natural gas, U. S. by States, Mcf								
a. from gas wells			B 55	B	B			
b. from oil wells			B 55	B	B			
c. total			B 55	B	B			
42. Disposition of natural gas in U. S., Mcf								
a. marketed production			B 55	B	B			
b. repressuring			B 55	B	B			
c. vented and flared			B 55	B	B			
43. City gate (wholesale) prices to distributors in 14 metropolitan areas, cents per Mcf. (areas are named)	A 51							

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION XI	Coverage			Information breakdown				
Gas Company Employees and Payroll	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
1. Employees, gas utility and pipeline companies, all types of gas;								
a. no. of employees	A 48		D 52	A,D	D		A	
b. total payroll			D 52	D	D			
c. average pay per employee			D 52	D	D			
2. Employees, gas utility and pipeline companies, natural gas companies only								
a. no. of employees			D 52	D	D			
b. total payroll			D 52	D	D			
c. average pay per employee			D 52	D	D			

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION XII Data Published Less Frequently than annually	Coverage			Information breakdown				
	Inter-state gas	Intra-state gas	Undifferentiated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
1. Actual and estimated U. S. natural gas requirements, total U. S., by regions, & by States								
a. firm								
(1) residential			E 58	E	E			
(2) commercial			E 58	E	E			
(3) industrial			E 58	E	E			
b. interruptible			E 58	E	E			
c. other			E 58	E	E			
d. field use			E 58	E	E			
e. total			E 58	E	E			
(1) actual, each of past 5 years			E 58	E	E			
(2) estimated, each of 3 future years			E 58	E	E			
(3) projected, each 5th year for 20 years			E 58	E	E			
2. Natural gas purchased by manufacturers for industrial fuel; U. S. total								
a. total, all industries			E 59	E				
b. each industry group by SIC code & name			E 59	E				
(1) quantity, Mcf			E 59	E				
(2) cost, dollars			E 59	E				

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American as Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

SECTION XII Data Published Less Frequently than annually (con'd)	Inter-state gas	Intra-state gas	Undif-ferenti-ated	U. S. total	State total	Company total by State	Company total	Area, plant or system total
3. Natural gas purchased by manufacturers for industrial fuel; total,								
a. quantity, Mcf			E 59	E	E			
b. cost, dollars			E 59	E	E			
4. Natural gas purchased by manufacturers for industrial fuel, by Standard Industrial Classification of purchasers;								
a. total U. S.			E 59	E	E			
b. each industry group by SIC code & name within each State			E 59	E	E			
c. quantity, Mcf			E 59	E	E			
d. cost, dollars			E 59	E	E			
5. Natural gas purchased by manufacturers for industrial fuel, by SIC's (named & coded) under each Standard Metropolitan Statistical Area of 40,000 or more manufacturing employees								
a. quantity, Mcf			E 59	E				
b. cost, dollars			E 59	E				

Sources: A = Federal Power Commission (FPC); B = U. S. Bureau of Mines (BM); C = Brown's Directory of North American Gas Companies (Brown's Directory); D = American Gas Association (AGA); E = Other.

CANADIAN NATURAL GAS DATA

Key to Tabulations

C P A = Canadian Petroleum Association, "Statistical Yearbook"

C G A = Canadian Gas Association, "Statistical Summary"

D B S (Prod) = Dominion Bureau of Statistics,
"Crude Petroleum and Natural Gas Production"

M R B = Mineral Resources Branch, Department of Energy, Mines and Resources, "Natural Gas Processing Plants in Canada"

D B S (Sales) = Dominion Bureau of Statistics,
"Sales of Manufactured and Natural Gas"

All data are by Province unless otherwise noted.

APPENDIX B

SECTION XIII Canadian Natural Gas Data	Sources CPA	CGA	DBS (prod)	MRB	DBS (sales)
1. Reserves					
a. proved original raw natural gas in place, by geologic age	X				
b. probable original raw natural gas in place, by geologic age	X				
c. proved ultimate raw natural gas reserves, by geologic age	X				
d. probable ultimate raw natural gas reserves, by geologic age	X				
e. proved ultimate marketable natural gas reserves, by geologic age	X				
f. probable ultimate marketable natural gas reserves, by geologic age					
g. established reserves for natural gas production		X			
2. Drilling (wells completed as gas producers), number of wells and footage drilled					
a. exploratory wells completed					
(1) new field wildcats	X				
(2) new pool wildcats	X				
(3) deeper pool tests	X				
(4) shallower pool tests	X				
(5) outposts	X				
(6) total	X				
b. development wells completed	X				

Sources: Canadian Petroleum Association (CPA); Canadian Gas Association (CGA); Dominion Bureau of Statistics (DBS)(prod); Mineral Resources Branch (MRB); Dominion Bureau of Statistics (DBS)(sales).

SECTION XIII Canadian Natural Gas Data (con'd)	Sources				
	CPA	CGA	DBS (prod)	MRB	DBS (sales)
3. Gas processing plants					
a. operator	X			X	
b. plant location				X	
c. fields served	X			X	
d. type of plant				X	
e. year of first operation	X				
f. feed (raw gas) capacity	X			X	
g. output capacity:					
(1) residue gas				X	
(2) propane				X	
(3) butane				X	
(4) pentane plus				X	
(5) sulfur				X	
4. Pipelines					
a. operator	X				
b. point of origin	X				
c. destination	X				
d. source of gas	X				
e. year of first operation	X				
f. length of line or system					
(1) gathering	X				
(2) trunk	X				

Sources: Canadian Petroleum Association (CPA); Canadian Gas Association (CGA); Dominion Bureau of Statistics (DBS)(prod); Mineral Resources Branch (MRB); Dominion Bureau of Statistics (DBS)(sales).

SECTION XIII Canadian Natural Gas Data (con'd)	Sources				
	CPA	CGA	DBS (prod)	MRB	DBS (sales)
4. g. capacity					
(1) present	X				
(2) ultimate	X				
h. throughput during latest year	X				
i. markets served	X				
5. Gross withdrawals		X	X		
6. Field & processing plant disposal					
a. flared and wasted at fields			X		
b. injected			X		
c. field use			X		
d. gathering system use			X		
e. processing plant use			X		
f. shrinkage at processing plants			X		
g. other uses			X		
h. deliveries of gas to utilities			X		
7. Gas utilities					
a. receipts of natural gas			X		
(1) from fields			X		
(2) from processing plants			X		
(3) from distributor storage			X		
(4) imports			X		X
(5) LPG for gas enrichment, peak shaving			X		

Sources: Canadian Petroleum Association (CPA); Canadian Gas Association (CGA); Dominion Bureau of Statistics (DBS)(prod); Mineral Resources Branch (MRB); Dominion Bureau of Statistics (DBS)(sales).

APPENDIX B

SECTION XIII Canadian Natural Gas Data (con'd)	Sources CPA	CGA	DBS (prod)	MRB	DBS (sales)
7. b. sales of natural gas					
(1) residential					
(a) no. of space heating customers					X
(b) total no. of customers					X
(c) quantity sold		X			X
(d) revenue from sales		X			X
(2) industrial					
(a) no. of firm customers (national total)					X
(b) no. interruptible customers (national only)					X
(c) total no. of industrial customers					X
(d) quantity sold		X			X
(e) revenue from sales		X			X
(3) commercial					
(a) no. of customers					X
(b) quantity sold		X			X
(c) revenue from sales		X			X
(4) total sales of natural gas		X	X		X
8. Direct deliveries for industrial consumption & miscellaneous utility deliveries			X		
9. Deliveries to distributor storage			X		
10. Pipeline storage fluctuation			X		

Sources: Canadian Petroleum Association (CPA); Canadian Gas Association (CGA); Dominion Bureau of Statistics (DBS)(prod); Mineral Resources Branch (MRB); Dominion Bureau of Statistics (DBS)(sales).

SECTION XIII Canadian Natural Gas Data (con'd)	Sources				
	CPA	CGA	DBS (prod)	MRB	DBS (sales)
11. Pipeline fuel			X		
12. Pipeline losses			X		
13. Exports			X		
14. Pipeline sales of liquefied petroleum gases					
a. no. of customers					X
b. quantity sold					X
c. revenue from sales					X
15. Pipeline sales of manufactured gas					
a. no. of customers					X
b. quantity sold					X
c. revenue from sales					X

Sources: Canadian Petroleum Association (CPA); Canadian Gas Association (CGA); Dominion Bureau of Statistics (DBS)(prod); Mineral Resources Branch (MRB); Dominion Bureau of Statistics (DBS)(sales).